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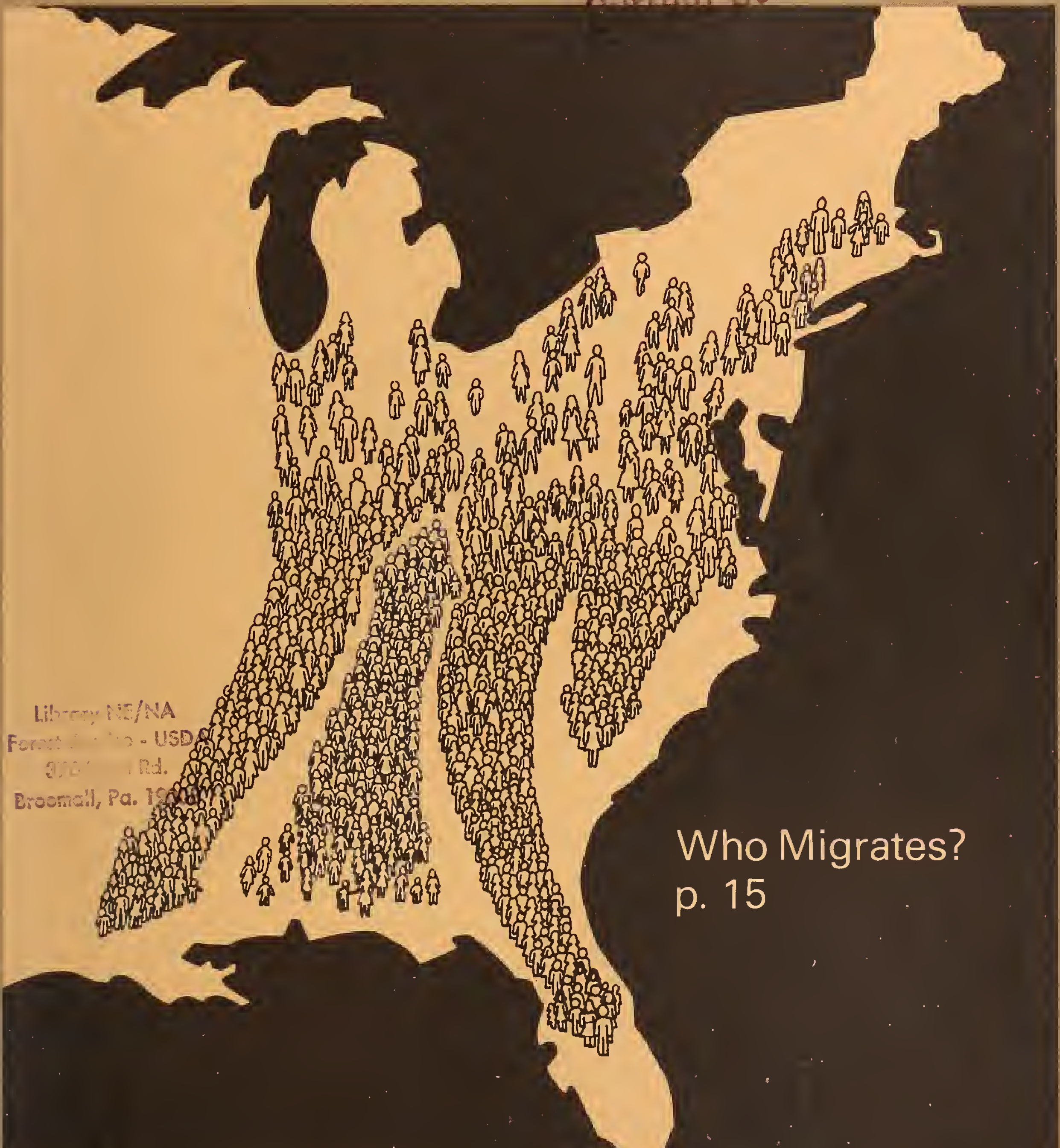

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Who Migrates?
p. 15

Agricultural Economics Research

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Good data for rural development research are hard to come by. USDA researchers frequently find themselves trying to squeeze rural development information out of data which were collected for other purposes. The data traditionally collected by the agricultural establishment are frequently not applicable to rural research. Such data are generally collected with an agricultural problem in view, yet six out of seven people in rural areas are not farmers. Persons involved in urban and national research and policymaking tend to be the collectors of nonfarm data, and they collect with their problems in mind. Consequently, persons doing research on nonfarm, nonmetropolitan problems sometimes feel trapped in a double-negative data bind.

When a new source of secondary data shows potential for describing rural problems, it attracts attention in rural development circles. Such was the case when USDA commissioned the Bureau of the Census to prepare tabulations from the May 1975 Current Population Survey using an updated definition of metropolitan status. The Bowles article uses the special tabulation. Bowles found that persons moving into rural areas during the early seventies tended to have different social and economic characteristics than those moving out; they also have different characteristics than those rural people whose new neighbors these migrants have become. The number of movers is large; thus, these changes can affect social, political, and economic activity in rural areas for years to come.

Within the agricultural data establishment, good data on the hired farm workforce are relatively scarce. The Elterich article illustrates how old data can be turned to solving new problems. Information from a 1969/70 survey is used to assess likely impacts of legislation which became effective in 1978 concerning unemployment insurance.

Data used by agricultural economists for commodity analyses are relatively plentiful, and the researcher tends to become more concerned with difficulties stemming from explanatory methods than data sources when working on such problems. Mittelhammer and Price demonstrate how prior knowledge, such as the fact that demand for food is inelastic, can be combined with sample data so that mixed estimation techniques can be used to develop econometric models. Gallagher illustrates a corn acreage response model for which the elasticity of response varies according to whether market prices are close to support levels.

The final article in this issue was written after the author read a book by Thomas S. Kuhn on the structures of scientific revolutions.

Clark Edwards

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ESTIMATING THE EFFECTS OF VOLUME, PRICES, AND COSTS ON MARKETING MARGINS OF SELECTED FRESH VEGETABLES THROUGH MIXED ESTIMATION

By Ron C. Mittelhammer and David W. Price*

Prior information derived from previous research, commodity specialists, market institutions, and introspection was used to estimate margin equations for selected fresh vegetables through the mixed estimation technique. Use of this information increased the precision of parameter estimates. Behavioral implications of the statistical results are examined.

Keywords:

Prior information
Mixed estimation
Margin behavior

INTRODUCTION

When constructing econometric models, the researcher often has *a priori* notions concerning the signs and magnitudes of a number of parameters. These notions (prior information) originate from previous research, economic theory, commodity specialists, knowledge, characteristics of institutions within the system under investigation, and/or introspection. Persons engaged in applied research implicitly admit having prior information whenever they reject a model because it does not fit their expectations.

The mixed estimation technique originated by Theil and Goldberger (*12*) combines pure, sample information with uncertain prior information for derivation of parameter estimates.[1] Stochastic linear restrictions on a linear model's parameters represent the uncertain prior information. The disturbance terms associated with the linear restrictions are generally assumed to follow a normal distribution, although, in principle, the disturbances could be assumed to follow other continuous distributions. Essentially, the mixed estimate is an application of generalized least squares to a data set in which sample data and prior constraints are combined. Extensions have been made by Theil (*11*), Nagar and Kakwani (*8*, *9*), Kakwani (*4*), Swamy and Mehta (*10*), Yancy and others (*13*, *14*), Mittelhammer (*6*), and others.

A substantial number of properties, descriptive statistics, and tests of hypotheses concerning mixed estimators have been established. These include the percentage of the posterior precision of the mixed estimates that is due to prior information, a statistical test to determine if the prior information is compatible with the sample information, and tests to determine if the mixed estimator has smaller mean square error (that is, the expected squared distance of parameter estimates from true population parameter values) than estimates based on sample information alone (*6*, *14*).

A set of marketing margin relations was estimated for seven fresh vegetables (cabbage, carrots, celery, cucumbers, green peppers, lettuce, and tomatoes) (*7*). Prior estimates of the effects of volume, prices, and costs on the marketing margins were available from various sources, including consultations with commodity specialists and introspection by the authors (*2*, *3*, *5*). The mixed estimation technique provided estimates of the parameters that were judged mean square error superior to pure sample-based estimates.

The objectives of this article are twofold: (1) to illustrate the mixed estimation technique and (2) to provide estimates of the margin-forming behavior of produce markets.

THE MODEL

The margin behavior relations of the seven fresh vegetables were a subset of a complete model of domestic demand for the vegetables (*7*). The relations were specified in general functional form as:

$$M_{VEGi} = M_{VEGi}\left(P^f_{VEGi}, Q^d_{VEGi}, IWPI, U_{VEGi}\right) \quad (1)$$

---

*Ron C. Mittelhammer is assistant professor of agricultural economics and David W. Price is professor of agricultural economics with Washington State University. This article reports research in which the senior author was engaged while he was with the Commodity Economics Division, ESCS.

[1] Italicized numbers in parentheses refer to items in References at the end of this article.

where

M_{VEGi} = Dollar margin associated with vegetable i per pound retail weight

P^f_{VEGi} = Dollar farm value of vegetable i per pound retail weight equivalent

Q^d_{VEGi} = Quantity of fresh vegetable i demanded by domestic consumer, in million pounds retail weight

IWPI = Industrial wholesale price index, 1967 = 1.000

U_{VEGi} = Disturbance term, assumed to be normally distributed

In the first three definitions, for lettuce, margin and farm values are measured in dollars per head, and quantity is measured in million head.

For simplicity and because no prior considerations suggested a nonlinear relationship, we set the specific functional form of the margin relations in linear terms, and we had 22 annual observations on data from 1954 to 1975.

The specification of the margin relations was motivated by the work of Buse and Brandow (*2*). The relations express the margin of a particular vegetable per retail unit as a function of the farm value of the vegetable, the total quantity of it demanded by consumers, and a proxy (IWPI) for other marketing costs.[2]

Manchester shows that 79 percent of the wholesale produce firms participating in his study used, in establishing margins, either a constant percentage of acquisition or selling price or a constant per unit markup above costs (*5*). An additional 18 percent of the firms indicated that supply and demand forces established prices or that these firms charged according to what the market would bear. Buse and Brandow maintain that "a large amount of evidence supports the conclusion that changes in farm-retail price spread over a period of time are determined primarily by changes in costs of all factors employed in processing and distributing operations" (*2*). Including the farm price and an intercept term in a linear equation provides measures of percentage markups and per unit markups. George and King used a specification algebraically similar to the margin equation; they expressed farm price as a linear function of retail price (*3*).

The quantity variable accounts for the marketing firms' reactions to changes in the level of quantity demanded. Changes in the margin will occur if marketing firms attempt to charge what the market will bear and adjust the level of margin in response to the strength of demand, or if the firms experience economies of size.

The IWPI is a proxy for all costs other than for raw product acquisition. Buse and Brandow indicate that the IWPI serves as a useful proxy for costs of factors employed in processing and distributing (*2*).

THE PRIOR INFORMATION

We formed prior estimates of the ranges for the mean margin elasticities with respect to farm prices, volume, and IWPI. We based these estimates on discussion with commodity specialists and colleagues, characteristics of institutions in produce markets, past research, and introspection.

The research by George and King (*3*) and Buse and Brandow (*2*) provided information that helped us form prior estimates of the likely range of elasticities of the margins for farm prices. The following mean level elasticities were obtained from the results of George and King:

$$\begin{aligned} E_{M,PCAR} &= 0.15 \\ E_{M,PLET} &= 0.51 \\ E_{M,PTOM} &= 0.88 \end{aligned} \tag{2}$$

Buse and Brandow calculated the following mean level elasticities of the margins for retail prices for a pre-1957 period:

$$\begin{aligned} E_{M,PCAB} &= 0.56 \\ E_{M,PLET} &= 0.58 \end{aligned} \tag{3}$$

Assuming the elasticities of price transmission are less than one, the estimates in (3) are upper bounds to the elasticities of the margins for farm prices.[3]

Given the previous estimates and the argument that elasticities among commodities with similar characteristics should be similar, the prior range of values for the mean level elasticities of the margins for farm prices was:

$$E_{M,Pf} \in [-0.25, 0.75] \text{ with probability } 0.95 \tag{4}$$

For estimation, a prior point estimate of $\hat{E}_{M,Pf} = 0.25$, assumed to be generated by a normally distributed process with variance equal to 0.0625, was used to represent the prior information (4).

Buse and Brandow reported a positive relationship between margin and volume for cabbage and a negative, but statistically insignificant, relationship for lettuce. The mean level elasticities were calculated to be 0.36 for cabbage and −0.42 for lettuce.

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[2] The farm value of a vegetable per pound refers to the price paid to the farmer for an amount of raw product sold at retail. For example, 1.18 pounds of fresh tomatoes at the farm are equivalent to 1 pound at retail. The difference between quantities at the farm and at retail is due to waste, shrinkage, and spoilage as the commodity passes through the market system. In this article, the term "farm price" will refer to the value of a vegetable per pound of retail weight equivalent.

[3] As would be indicated by the results of George and King (*3*, p. 62).

We anticipate that volume and margin will be positively related as, in times of slack demand, margins are expected to be lower than in times when demand is strong. This view is supported by Manchester's finding that many produce handlers report charging what the market will bear, or according to supply and demand (*5*). Our prior estimate of the range for the mean level elasticities of the margins for volume was:

$$E_{M,Q} \in [0, 2] \text{ with probability } 0.95 \qquad (5)$$

The prior information (5) was represented as a normally distributed prior point estimate $\hat{E}_{M,Q} = 1$ with variance equal to 0.25.

Finally, Buse and Brandow, using the average market basket farm-retail price spread index as a proxy for costs in marketing, obtained the following elasticities:

$$E_{CAB,COST} = 1.09$$

$$E_{LET,COST} = 0.62 \qquad (6)$$

They stated that using the IWPI in place of the market basket index made little change in the results, although they did not present them. As the market basket index is directly determined by the margin setting behavior of marketers while the wholesale price index is not, we believed that the IWPI would serve as a better proxy for the costs of marketing inputs.

The prior estimate of the interval for the mean level elasticities of the marketing cost margins was:

$$E_{M,IWPI} \in [0, 1.5] \text{ with probability } 0.95 \qquad (7)$$

The prior information (7) was represented as a normally distributed prior point estimate $\hat{E}_{M,IWPI} = 0.75$ with variance equal to 0.140625. The covariances among the three prior constraints were assumed to be zero for each margin relation. The implication is that errors in the prior estimates of one coefficient do not affect prior estimates of the other coefficients in the equation. This assumption is plausible because prior estimates on an equation's coefficients were selected independently of one another.

RESULTS

Statistical

The margin equations were estimated with two-stage least squares mixed estimation.[4] The parameter estimates, share of prior information in the posterior precision, the χ^2 test of compatibility between sample and prior information (χ^2_3), and the simple correlation between the actual and predicted value of the margin appear in table 1.[5] Except for cucumbers, the prior estimates provided less than 20 percent of the information present in the posterior precision of the mixed estimates. Therefore, much of the information used to calculate the mixed estimates came from the sample.

The χ^2 test of compatibility indicates that, except for cabbage, the sample and prior information are judged compatible at the 0.05 level of Type I error. Acceptance of compatibility implies acceptance of strong mean square error superiority; that is, every linear combination of the mixed parameter estimates is smaller in mean square error than a corresponding linear combination of the pure estimates. For cabbage, compatibility is accepted at the 0.025 level of Type I error. Through a test of strong mean square error superiority based on the noncentral χ^2 distribution (see *6*), the mixed estimate of the cabbage relation is strong mean square error superior to pure estimates of the parameters at the 0.05 level of Type I error.

The lowest simple correlation between actual and predicted values of the margin was 0.885. Six of the seven margin relations exhibited simple correlations of 0.944 or better.

To provide a comparison between pure estimates (based on sample information only) and mixed estimates (based on sample and prior information), we present a table of prior, pure, and mixed mean level elasticity estimates (table 2). Two standard deviation (95-percent confidence level) intervals are also provided.

Although occasionally the pure and mixed estimates are not especially close to each other, most are the same general order in magnitude and all interval estimates overlap substantially. The point estimates of three of the 21 elasticities differed in sign between the prior and pure estimates. For these three elasticities, the mixed point estimates agreed in sign with the prior estimates in two cases and with the pure estimate in one case. A number of entries in table 2 illustrate that because of the covariance structures of the two-stage least squares estimate, the mixed point estimates need not lie inbetween the prior and pure estimates.

The variances of the mixed estimates were less than the variance of the pure estimates in every case. Consequently, the mixed estimation intervals averaged 21 percent shorter than the pure estimation intervals. In a few cases, the reductions in length were over 50 percent. However, it is evident upon examining tables 1 and 2 that, although generally the mixed estimates represented a relative improvement over pure estimates, in several cases confidence in individual point estimates remained rather low.

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[4] For a discussion of the first stage of the two-stage analysis, see Mittelhammer (*7*). The first stage included predetermined variables that appeared in equations other than the margin relations.

[5] The simple correlations are computed using actual values for right-hand-side endogenous variables.

Table 1—2SLS-ME results for margin relations

Dependent variable	Independent variables				Share of prior information in precision	χ^2_3	r
	Constant	$p^f{}_{VEG}$	Q_{VEG}	IWPI			
M_{CAB}	1.617 (.57/.284)	1.011 (5.88/<.001)	.00050 (.28/.390)	2.032 (1.95/.026)	0.196	9.079	0.944
M_{CAR}	−3.119 (−1.22/.111)	−.117 (−.80/.212)	.00601 (2.43/.008)	7.547 (6.00/<.001)	.109	2.160	.948
M_{CEL}	−12.569 (−5.27/<.001)	.630 (3.38/<.001)	.01189 (5.25/<.001)	5.813 (4.98/<.001)	.101	.878	.973
M_{CUC}	−2.825 (−.47/.319)	.296 (.84/.201)	.01447 (1.09/.138)	8.005 (2.51/.006)	.418	4.537	.885
M_{GP}	−7.177 (−1.29/.099)	.561 (2.69/.004)	.03299 (1.87/.031)	9.578 (2.67/.004)	.182	2.342	.944
M_{LET}	−25.463 (−1.60/.055)	.481 (2.08/.019)	.01554 (11.23/<.001)	4.166 (1.97/.024)	.144	7.055	.985
M_{TOM}	−9.299 (−1.77/.038)	.592 (3.26/<.001)	.00876 (3.00/.001)	7.298 (2.30/.011)	.139	2.397	.967

Note: Except for $P^f{}_{VEG}$, all parameter estimates have been scaled by multiplying times 100; $P^f{}_{VEG}$ and Q_{VEG} refer to the farm value and quantity demanded of the vegetable to which the dependent variable refers.

The asymptotic t-value and one-sided probability value are presented below each coefficient as asymptotic t-value/probability value. The probability values are based on the normal distribution.

Behavioral

The relationships between the margins of the seven vegetables and the farm value were positive in all cases except carrots, where the farm value is inversely related to the margin. For carrots, we have considerable doubt concerning the validity of the sign or magnitude of the coefficient due to the large variance of the estimate. Excluding carrots, the margin relations indicate that a 1-percent increase in the farm value of a vegetable will result in a first-round increase in the margin of from 0.158 percent (cucumbers) to 0.427 percent (cabbage). It is a first-round increase because the interaction effect on volume has not been considered.

Converting the elasticities of the margin to elasticities of price transmission (the percentage change in the retail price given a 1-percent change in the farm price) results in:

$$E_{Pcab,\,P^f{}_{cab}} = 0.597 \qquad E_{Pcar,\,P^f{}_{car}} = 0.271$$

$$E_{Pcel,\,P^f{}_{cel}} = .490 \qquad E_{Pcuc,\,P^f{}_{cuc}} = .451$$

$$E_{Pgp,\,P^f{}_{gp}} = .576 \qquad E_{Plet,\,P^f{}_{let}} = .556$$

$$E_{Ptom,\,P^f{}_{tom}} = .581 \qquad (8)$$

Except for carrots, the magnitudes of the elasticities of price transmission are consistent. For the other six vegetables, a 1-percent change in farm value would result in a first-round change in retail price ranging from 0.451 percent to 0.597 percent.

The elasticities of the margins for quantities are all positive (table 2). Thus, the first-round change in margins and retail prices due to changes in farm values will be dampened when an interaction with negatively sloped demand curves is allowed.[6] Marketing margins for the salad vegetables will increase when quantity demanded increases and decrease when quantity demanded falls. Unlike the reaction to farm price changes, the elasticities of the margins for quantities demanded differ substantially in magnitudes, from a low of 0.105 for cabbage to a high of 2.024 for lettuce.

The elasticity of the marketing cost margin is uniformly positive and ranges from a low of 0.267 for cabbage to 0.670 for carrots (table 2). As with farm value, these elasticities represent first-round effects that occur before quantity demanded is allowed to change. Given the positive values of $E_{m,q}$, the upward effect on the margins for an increase in the cost index will be dampened by the effects of the increased retail price on volumes sold.

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[6] Estimates of retail demand curves for the seven salad vegetables can be found in (7).

To provide an overall view of the effects of farm price and quantity on the margins, we graphed retail and farm level demand relationships for lettuce (chart). The vertical difference between the two demand schedules is equal to the margin:

$$M_{LET} = a + b_1 Q_{LET} + b_2 P^f_{LET}$$

$$= \frac{1}{1 + b_2} \left(a + b_1 Q_{LET} + b_2 P^r_{LET}\right)$$

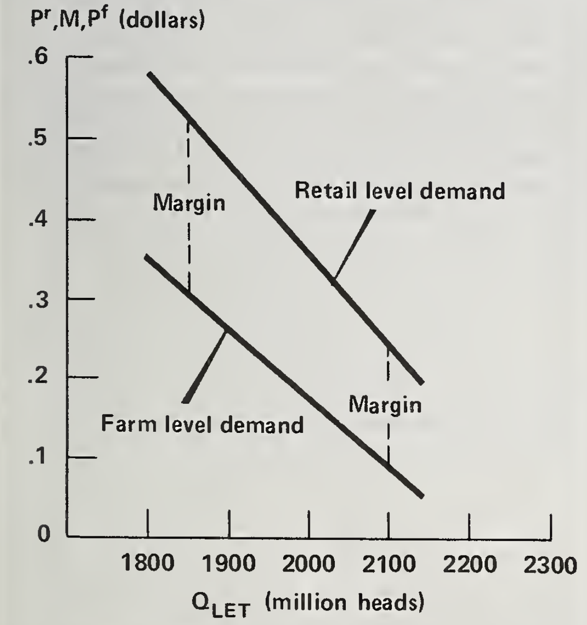
since $P^f_{LET} = P^r_{LET} - M_{LET}$. The demand curves are drawn at the mean levels of the other arguments of the functions.

The net effect of farm price and quantity is to decrease the margin as quantity increases and price decreases. As a result, the farm level demand schedule is flatter than at the retail level. The results are similar for the other vegetables excluding carrots. For carrots, the retail level demand schedule is flatter than the farm level demand.

Table 2—Comparison of prior, pure 2SLS, and mixed 2SLS estimates of mean level elasticities of the margins for farm values, quantities demanded, and cost index using two standard deviation confidence intervals

Elasticity	Prior	Pure 2SLS	Mixed 2SLS
M_{CAB}, P^f_{CAB}	0.25 ± 0.5	0.448 ± 0.162	0.427 ± 0.145
M_{CAB}, Q_{CAB}	1. ± 1.	-.935 ± 1.159	.105 ± .752
$M_{CAB}, IWPI$	.75 ± .75	.288 ± .320	.267 ± .273
M_{CAR}, P^f_{CAR}	.25 ± .5	-.060 ± .141	-.052 ± .130
M_{CAR}, Q_{CAR}	1. ± 1.	.552 ± .633	.645 ± .530
$M_{CAR}, IWPI$	.75 ± .75	.706 ± .242	.670 ± .223
M_{CEL}, P^f_{CEL}	.25 ± .5	.280 ± .173	.271 ± .160
M_{CEL}, Q_{CEL}	1. ± 1.	1.359 ± .552	1.261 ± .480
$M_{CEL}, IWPI$	.75 ± .75	.468 ± .220	.504 ± .202
M_{CUC}, P^f_{CUC}	.25 ± .5	.471 ± .881	.158 ± .376
M_{CUC}, Q_{CUC}	1. ± 1.	-1.078 ± 1.816	.430 ± .791
$M_{CUC}, IWPI$	.75 ± .75	.627 ± .743	.486 ± .387
M_{GP}, P^f_{GP}	.25 ± .5	.421 ± .295	.328 ± .244
M_{GP}, Q_{GP}	1. ± 1.	.345 ± .770	.548 ± .589
$M_{GP}, IWPI$	.75 ± .75	.381 ± .354	.398 ± .298
M_{LET}, P^f_{LET}	.25 ± .5	.273 ± .352	.289 ± .278
M_{LET}, Q_{LET}	1. ± 1.	2.216 ± .414	2.024 ± .360
$M_{LET}, IWPI$	.75 ± .75	.143 ± .318	.273 ± .278
M_{TOM}, P^f_{TOM}	.25 ± .5	.445 ± .257	.341 ± .209
M_{TOM}, Q_{TOM}	1. ± 1.	.573 ± .576	.728 ± .486
$M_{TOM}, IWPI$	.75 ± .75	.200 ± .339	.328 ± .285

Lettuce Margin Behavior, Mean Level of Data



To examine the effects of changing farm level prices on retail price and margins after quantity demanded is allowed to interact, we combined the margin relations in table 1 with retail demand equations estimated elsewhere (7) to derive a partial reduced form. Mean level elasticities were computed and partial elasticities are also summarized (table 3).

The magnitudes of the partial elasticities are larger than the elasticities in which quantity demanded has been allowed to change in response to price stimuli. One reason is that the price-quantity demand relationships for the vegetables are negatively sloped (7). A farm level price increase leads to an increase in retail price and a decrease in quantity demanded. The decrease in quantity demanded leads to a decrease in the margin, one that is lower than the partial effect of a farm price change would indicate.

Except for carrots, marketers' final reaction to a higher level of farm value is to raise the level of the margins. Such a response could be expected as, if margins were not increased, marketers' revenues would decrease, given negatively sloped demand curves.

Table 3—Mean level elasticities

A 1-percent change in—	Percentage change in—			
	Retail price		Margin	
	With Q interaction	*Partial*	*With Q interaction*	*Partial*
P^f_{cab}	0.586	0.597	0.411	0.427
P^f_{car}	.227	.271	-.113	-.052
P^f_{cel}	.406	.490	.115	.271
P^f_{cuc}	.419	.451	.079	.158
P^f_{gp}	.538	.576	.267	.328
P^f_{let}	.480	.556	.182	.289
P^f_{tom}	.469	.581	.165	.341

CONCLUSIONS

Our objectives were to apply and evaluate the mixed estimation technique, and to specify the margin-forming behavior of produce markets.

The prior information used in the model was probabilistic, and its degree of uncertainty was included. Prior information was compatible with sample information, for all but one vegetable, at the 0.05 level of significance. For the exception, the mean square error test showed the mixed estimation estimates were superior to the pure estimates. For six of the seven vegetables, the prior information was responsible for less than 20 percent of the posterior precision of the estimates.

Regarding behavioral implications of the model, aggregate farm-retail price spreads for cabbage, celery, cucumbers, green peppers, lettuce, and tomatoes increased when farm price increased. The inverse relationship occurred for carrots, probably because of estimation error.

Aggregate margins increase when quantity demanded increases and they decrease when retail demand weakens. The behavior reflects a tendency of many marketers to charge what the market will bear and/or to attempt to equate demand forces with supply. Aggregate margins increased when marketing cost (proxied by the industrial wholesale price index) increased.

In our application, the mixed estimator resulted in parameter estimates that were relatively more precise than those derived from sample information alone. The extent to which it will improve the estimates in applications is problem specific. However, in modeling situations where respectable research has been previously accomplished and/or specialists familiar with the structure of the system under study are available, it would appear desirable to use prior information in parameter estimation. Statistical tests exist to indicate conflicts between the sample information and prior notions. Another test determines whether the precision of parameter estimates will be increased concomitant with decreases in the mean square errors of estimators. The U.S. Department of Agriculture is a prime example of an institution in which substantial amounts of commodity specialist expertise can be used to bolster the historical sample information base, and improve the estimation of commodity models.

In Earlier Issues

The beginner need not let the language and notation of the mature mathematical statistician deter him. The vocabulary and symbolism must be learned sometime by a prospective statistician and it may as well be at the start of his career.

Walter A. Hendricks
Vol. III, No. 1, Jan. 1951, p. 37

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In Earlier Issues

Collective action is now dominant in America and in all other important national economies throughout the world. Its principal forms in America are corporations, labor unions, and political parties. If economic analysis is to be directed to real problems of policy instead of merely to the solution of logical problems of mathematics, it cannot escape the analysis of collective action and the choice of alternatives available under collective action. In a period characterized by control economics, the most serious blindness is the illusion that it is possible to return to the individualism of the eighteenth century. The laissez-faire boys generally have already become pessimists who see America headed straight down the road to serfdom. The extreme Keynesians are already extreme optimists who seek only the authority to regulate the money switch.

Bushrod W. Allin
Vol. III, No. 1, Jan. 1951, p. 31

THE EFFECTIVENESS OF PRICE SUPPORT POLICY—SOME EVIDENCE FOR U.S. CORN ACREAGE RESPONSE

By Paul Gallagher*

A method is reported for measuring supply response in an environment in which Government price supports and market conditions both influence producers' decisions. This method is used to analyze U.S. corn acreage data.

Keywords:

Corn acreage response
Producer price expectations
Price support policy

INTRODUCTION

The decade of the seventies has brought a new economic environment for farmers' production decisions. Risk, increasing costs, and the influence of Government price support policy *vis a vis* market prices are important characteristics. Conceptual frameworks have been presented for assessing producers' reactions. Moreover, methods for measuring producers' responses to risk and cost inflation have been developed, confirming the significance of these characteristics.[1]

The role of Government support prices in this new environment has received less attention. In this article, I present a method of measuring price expectation for analyzing supply response when the influence of price support and market phenomena varies with market conditions. Then, I present estimates of U.S. corn acreage response using this expected price equation.

PRODUCER PRICE EXPECTATIONS IN THE CASE OF PRICE SUPPORTS: A REVIEW OF SOME CONCEPTS

In analysis of producer behavior under conditions of uncertainty, an accepted view starts with the assumption that producers perceive a probability distribution on price outcomes. Production then depends on the characteristics of this distribution. In all cases, output and expected price are positively related. And, unless producers are indifferent to risk, supply will also depend on the variance of the perceived distribution (*2*, pp. 439-488). In line with the findings of other authors, this study will allow for producers' reactions to price risk (*5*, *8*). However, my central concern is to investigate the role of Government support and market phenomena in forming producer price expectations.

The existence of price supports suggests a restriction on the probability distribution. Just points out that price supports define a risk floor below which the price paid to farmers cannot fall (*4*). Thus, a probability density function, $f(P)$, would have the following properties:

$$\int_{PS}^{\infty} f(P)\,dP = 1 \text{ and } PE = \int_{PS}^{\infty} P f(P)\,dP.$$

Other literature contains the assertion that the position of density function, $f(P)$, depends on past market phenomena.[2] To incorporate market conditions into the discussion, consider strong and weak markets. When the market has been weak, $f(P)$ shifts towards the support price. Expected price is very near the support price, and, hence, output should depend primarily on support prices. However, $f(P)$ shifts away from the risk floor when market prices have substantially exceeded support price. Under these circumstances, market price should have the predominant effect on output decisions (fig. 1).

METHODS FOR MEASURING PRODUCER RESPONSE TO SUPPORT AND MARKET PRICES

An appropriate econometric model of producer response to price would assign the dominant allocative role to support prices under weak market conditions and to market prices under strong market conditions. Some previous specifications do satisfy this criterion with the assumption that producer response to price is determined exclusively by past market price when prices are buoyant or support prices when the market is weak. However, it is often assumed that the response to support prices is constant, regardless of market conditions (*3*). Policy analysis would be enhanced if one allows for the possibility that support prices affect producers' decisions even under moderate and strong market conditions. The method that follows features market price elasticities that strengthen with market surges and support price elasticities that increase as markets weaken.

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[1] See (*4*) for a review of conceptual frameworks appropriate for incorporating risk, cost inflation, and support policy. Just (*5*) and Ryan (*8*) provide evidence that risk influences farmers' production decisions. Evans (*1*) shows that input cost increases have an effect on U.S. cotton acreage.

Note: Italicized numbers in parentheses refer to items in References at the end of this article.

[2] See (*4*, p. 3) for a summary.

An estimable production response model requires the statement of a supply relation and an expectations formation mechanism. To illustrate, consider a linear relation between supply (S_t) and expected price (PE_t):

$$S_t = a + \psi PE_t + \epsilon_t \qquad (1)$$

Supply shifters important in empirical analysis, such as expected prices for competitive crops, risk, costs, and policy variables, are allowed for in the constant (a). The expectations formation relation is a rather complicated function of current-year support price (PS_t) and previous crop year market price (PM_{t-1}):

$$PE_t = PS_t + \gamma \left[(D_t + 1)\, 1n\, (D_t + 1) - D_t \right] \qquad (2)$$

where

$$D_t = PM_{t-1} - PS_t$$

The advantage of this expected price formulation is that the response of expected price to changes in market or support price can be expressed as a simple function of the difference between market and support price (D_t):[3]

$$\frac{\partial PE_t}{\partial PM_{t-1}} = \beta_t\,(D_t) \qquad (3a)$$

and

$$\frac{\partial PE_t}{\partial PS_t} = 1 - \beta\,(D_t) \qquad (3b)$$

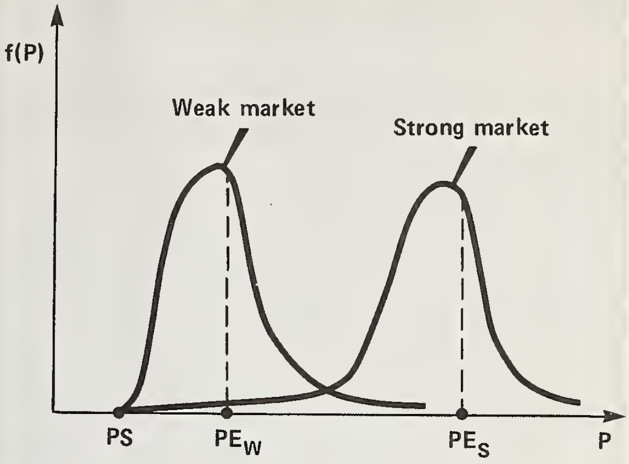
where

$$\beta\,(D_t) = \gamma 1n(D_t + 1)$$

For strategic assignments of the parameter γ (that is, $\gamma > 0$ and not too large), $0 \leqslant \beta\,(D_t) \leqslant 1$. Under these circumstances, supply response to market and support prices can be expressed as the supply response parameter (ψ) and a multiplier $\beta(D_t)$ or $(1 - \beta(D_t))$ which varies with market conditions:

FIGURE 1

Probability Distributions and Expected Prices for Strong and Weak Market Conditions



$$\frac{\partial S_t}{\partial PM_{t-1}} = \psi \beta\,(D_t) \qquad (4a)$$

$$\frac{\partial S_t}{\partial PS_t} = \psi \left[1 - \beta\,(D_t) \right] \qquad (4b)$$

The analogous elasticities for support and market prices are:

$$^{e}S_t \cdot PM_{t-1} = \frac{PM_{t-1}}{S_t}\ \psi \beta\,(D_t) \qquad (5a)$$

$$^{e}S_t \cdot PS_t = \frac{PS_t}{S_t}\ \psi \left[1 - \beta\,(D_t) \right] \qquad (5b)$$

An examination of the multiplier, $\beta\,(D_t) = \gamma 1n(D_t + 1)$, verifies that supply elasticities can adjust appropriately with market conditions. Figure 2 illustrates this function when the parameter, γ, assumes positive values. $\beta\,(D_t)$ is zero, for example, when the market price falls to the risk floor ($D_t = 0$)—the corresponding elasticities for market and support prices are zero and one, respectively. As market conditions strengthen, $\beta\,(D_t)$ increases, so the market price elasticity increases and the support price elasticity decreases.

There are some limitations on this approximation to producer behavior. Under the strongest market conditions, it is plausible that producers base their decisions solely on market prices ($\beta = 1$) and ignore support policy. However, it would be unreasonable to suggest that negative weight is given to support policy ($\beta > 1$). A point on the horizontal axis of figure 2 (D_{max}) shows the limit of this approximation. Given an assignment for

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[3] In fact, the expected price equation (2) was obtained by specifying that expected price was an unknown function of PS_t and PM_{t-1} which satisfied (3a) and (3b). The procedure for finding a function given partial derivatives is described by Taylor (*9*, p. 437).

γ, price differences beyond this point suggest that farmers place a negative weight on support policy and more than complete weight on market phenomena.

METHODOLOGY

The central empirical issue is the extent of producer adjustment between support and market signals as market conditions vary. In the algebraic model, this issue reduces to estimating the value of the parameter γ in equation (2). When the supply and price expectation relations (equations (1) and (2)) are combined, however, the resulting relation between observable variables is nonlinear in the parameters ψ and γ:

$$S_t = a + \psi \left[PS_t + \gamma (D_t + 1) \ln (D_t + 1) - D_t\right] \qquad (6)$$

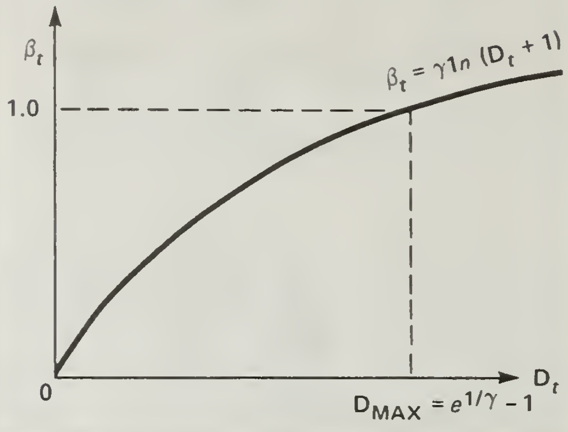
Least squares estimation of equation (6) would produce the best linear unbiased estimates of a, ψ, and $\psi\gamma$ with the usual assumptions about the residuals. In view of the emphasis on obtaining estimates of the structural parameter γ, however, a nonlinear maximum likelihood technique is superior, as this procedure would yield consistent, efficient estimates of a, ψ, and γ (*7*, p. 481). Parameter estimates are obtained with a program that minimizes the sum of squared residuals for a nonlinear regression equation—the objective function for this problem is the same as maximum likelihood estimation with the assumption of a normal disturbance term.

ESTIMATES OF U.S. CORN ACREAGE RESPONSE

Previous investigation of U.S. corn acreage response was designed to analyze the policy-dominated decades of the fifties and sixties, although later modification accounted for producer response to the strong market conditions of the mid-seventies. The early studies featured effective price support and diversion payment variables for measuring the composite effects of Government corn policies but producer response to market prices was not included. Important crop substitutions were also identified—sorghum and corn competed for land use during the fifties and a corn-soybean substitution has been significant through the last three decades. More recent estimates accounted for strong market prices with a spliced supply inducing price. That is, producers were assumed to respond to (1) effective support price prior to 1972 and (2) lagged market price afterwards.[4]

FIGURE 2

Price Adjustment Weight (β_t) Versus the Difference Between Support and Market Prices (D_t)



Estimates presented here verify the price expectation formulation (equation (6)) and extend the analysis to include other elements that have been important in the seventies. However, these specifications retain the basic Houck-Ryan formulation of policy variables and land use competition. Indeed, the substitution with soybeans was considered important enough to warrant the inclusion of an expected soybean price, where expected price is defined in (equation 6). Other explanations of acreage variation that have received attention recently are included in the corn acreage equation. Price risk is measured along the lines suggested by Ryan and cost increases are accounted for by deflating expected corn and soybean prices with variable cost measures.

Table 1 contains two specifications of the basic acreage response model. Both of these equations include expected prices relative to costs of production for corn and soybeans (PEC_t/CAC_t and PES/CAS_t)—the expected price variables are based on estimated values of adjustment parameters (γ_c and γ_s) for corn and soybeans. Both relations also feature corn diversion policy variables (DPC and DV66), a risk term ($RISK_t$), and a variable which measures substitution in the fifties between corn and grain sorghum ($ASGPM_t$). The difference between table equations 1.1 and 1.2 is that the latter equation also contains a lagged dependent variable; this specification is included as a test of the hypothesis that farmers cannot make complete adjustments when large price changes occur.

The statistical properties of both equations are acceptable. The R^2 statistic exceeds 97 percent in both cases, indicating that either set of explanatory variables provides a good explanation of historical corn acreage variation. Moreover, standard errors are small relative to estimated coefficient magnitudes, suggesting that

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[4] For a summary of previous corn acreage response studies, see (*3*, pp. 11-29).

Table 1—Nonlinear least squares estimates with corn planted acreage (ACP_t) as dependent variable, 1954-77

(Dependent variable mean: 72,993.5)

Equation	Constant	$DV66_t$	$ASGPM_t$	DPC_t	$RISK_t$	ACP_{t-1}	$\frac{PEC_t}{CAC_t}$	γ_c	$\frac{PES_t}{CAS_t}$	γ_s	R^2	$\bar{S}$	Sum of squared errors
(1.1):													
Coefficient	80,475.65	4,838.92	−0.40794	−64.079.79	−3,078.416		687,277.28	0.78356	−63,713.36	0.55584	.9746	1,288.46	28,222,159.0
Standard error	5,839.45	888.69	.16866	7,574.67	1.975.54		191,736.76	0.38980	38,668.88	0.40251			
Elasticity at mean				−0.091			0.159		−0.080				
(1.2):													
Coefficient	75,472.62	4,717.30	−0.432111	−61,362.73	−2,736.37	0.032449	768,859.05	0.888505	−51,753.99	0.59775	.9764	1,279.99	26,214,080.0
Standard error	7,702.00	886.97	.16808	7,830.16	1,968.31	.03657	206,094.67	.47573	42,473.42	0.56276			
Elasticity at mean				−0.087			0.178		−0.065				

Definitions of variables:

ACP_t: U.S. planted corn acreage (thousands)

$$DV66_t = \begin{cases} 1, \text{ 1966-72} \\ 0, \text{ otherwise} \end{cases}$$

$$ASGPM_t = \begin{cases} ASGP_t, \text{ 1954-66} \\ \overline{ASGP}, \text{ for previous period, 1961 to date} \end{cases}$$

$ASGP_t$: U.S. acreage in sorghum grains (thousands)
DPC_t: Corn, effective diversion payment rate (dollars/bushel)
PFC_t: Corn, effective price support (ditto)
PMC_t: Corn, U.S. season average price received by farmers (ditto)

CAC_t: Corn, variable costs per acre (dollars per acre)
PSS_t: Soybeans, effective price support (loan rate) (dollars per bushel)
PMS_t: Soybeans, U.S. season average price received by farmers (ditto)
CAS_t: Soybeans, variable costs per acre (dollars per acre)

$$RISK_t = \frac{(PMC_{t-1} - MAC_t)^2}{MAC_t}, \text{ where } MAC_t = 1/3\,(PMC_{t-2} + PMC_{t-3} + PMC_{t-4})$$

$$PEC_t = PFC_t + \gamma_c \left[(DC_t + 1)\ 1n\ (DC_t + 1) - DC_t\right], \text{ where } DC_t = PMC_{t-1} - PFC_t$$

$$PES_t = PSS_t + \gamma_s \left[(DS_t + 1)\ 1n\ (DS_t + 1) - DS_t\right], \text{ where } DS_t = PMS_{t-1} - PSS_t$$

implications about structure could be drawn from the estimates.

The parameter estimates are generally similar to those obtained in earlier studies, but there are some exceptions. The measured effects of diversion policy and sorghum substitution are similar to the ones reported earlier. The acreage response to a change in expected corn price is also in accordance with other studies—elasticity estimates are between 0.1 and 0.2. The response to changes in expected soybean price, however, is smaller than previously. The elasticity estimates in table 1, 0.07 to 0.08, are roughly half the magnitude of earlier estimates. The reduced effect on soybean price could be attributed to the risk term, which explains a significant portion of recent corn acreage variation. In fact, the risk estimate (equation 1.2) suggests that corn acreage expansions between 1972 and 1975 were above 3.0 million acres less than if there had been no increases in risk.

In short, either equation (1.1 or 1.2) adequately explains historical variation. However, (1.2) is probably more accurate, since it contains the lagged variable, which is statistically significant.

CORN PRODUCERS' RESPONSE TO SUPPORT AND MARKET PRICES

As shown, the parameter γ determines the extent of producer adjustment between support and market price. That is, γ-estimates determine the magnitude of the adjustment weight (β) for given market conditions. In turn, β determines support and market price elasticities. Estimates of the adjustment between Government and market prices for corn and soybeans are presented below.

Corn and soybean adjustment functions are illustrated in figures 3 and 4, wherein β estimates are plotted against the difference between market and support prices (D). Specific values of D are also indicated on the horizontal axes: (1) mean values for a period of high support and moderate market prices (1969-72), (2) mean values for a period of strong market and low support prices (1973-76) and (3) the maximum difference between support and market prices. During the early period, market prices had a moderate effect—β values were around 0.25 for both commodities. In contrast, both β values were near one at the height of the seventies' price explosion. However, even at average values from the high price period, support prices affected acreage response moderately, a tendency more pronounced for corn; only 60 percent of the weight can be assigned to market price changes.

Table 2 indicates the extent of corn producers' response to support and market prices as market conditions vary. Corn and soybean price elasticities are computed for the three types of market conditions indicated in figures 3 and 4. The corn elasticities suggest that support and market prices both retain an allocative role under strong and weak market conditions. The ratio of support to market price elasticities is about 2:1 for weak markets and 1:3 for strong markets. The market elasticity dominates only under the strongest market conditions. The soybean response estimate suggests a more complete adjustment between support and market signals. The support/market ratio is around 5:1 for weak markets and 1:7 for strong markets. Moreover, support price had virtually *no* effect when soybean prices were strongest.

Table 2—Corn acreage support and market price elasticities

Price / Market conditions	Corn		Soybeans	
	Support price	Market price	Support price	Market price
Weak[1]	0.13	0.06	0.05	0.01
Strong[2]	.06	.18	.01	.07
Strongest[3]	.02	.29	0	.10

[1] Based on mean values of data from 1969-72. [2] Based on mean values of data from 1973-76. [3] Based on data for the year when the difference between market and support price was largest—1975 for corn and 1977 for soybeans.

CONCLUSIONS

The estimates presented support the hypothesis that support price changes dominate under weak market conditions, while market prices prevail during the strongest market conditions. Moreover, corn support price influences farmers' decisions when moderate or strong market conditions prevail. Hence, support policy analysis which does not account for this assymetry could err in predicting the magnitude of farmers' acreage response.

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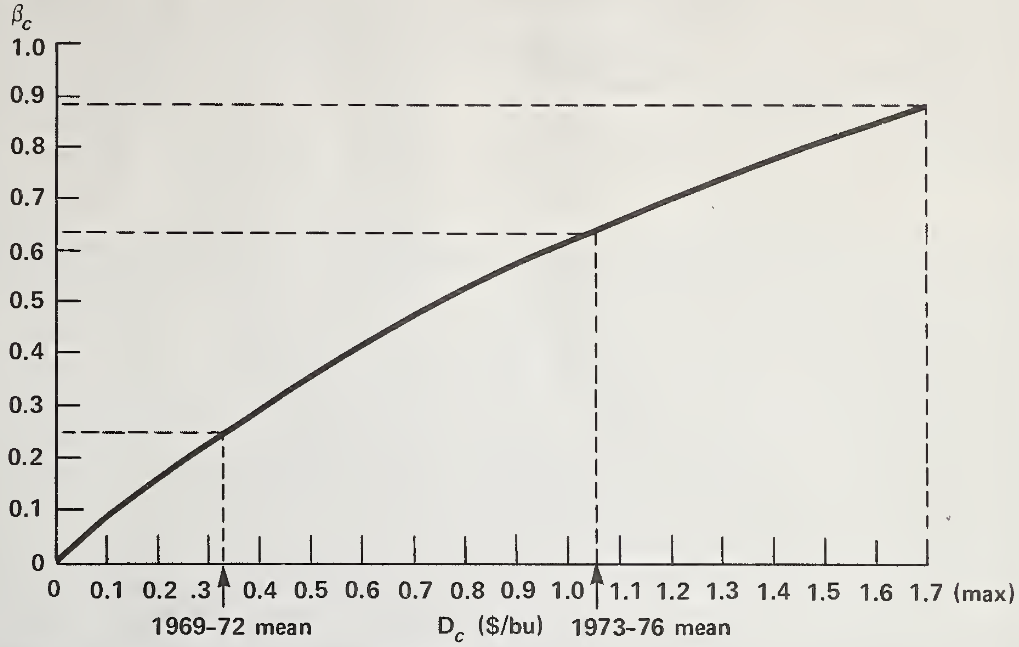
FIGURE 3

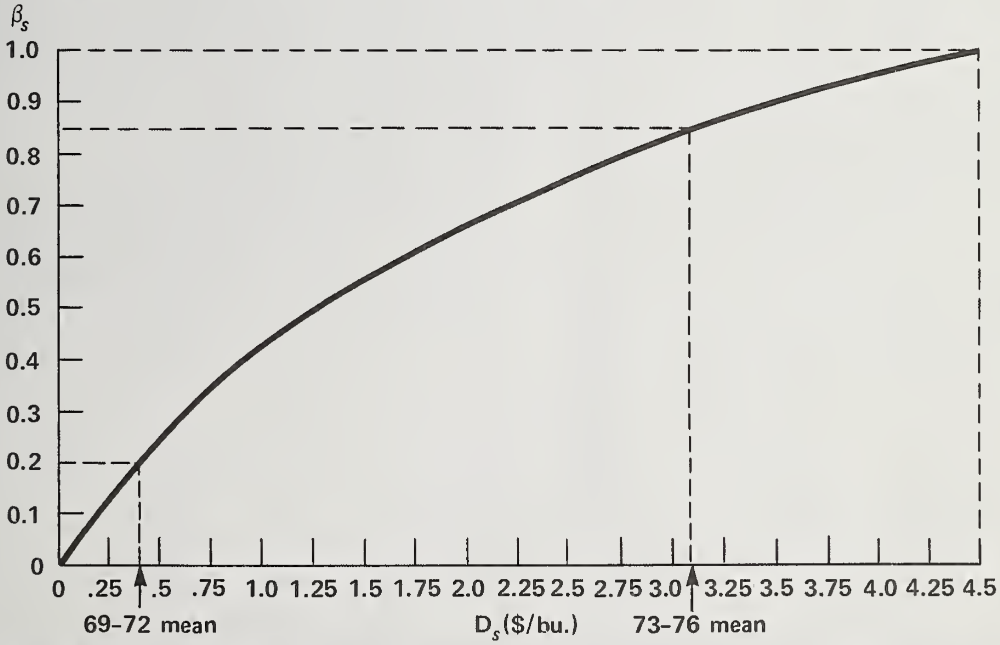
Corn: Market Price Adjustment Weight (β_c) Versus Difference Between Market and Support Price (D_c)



Note: $\beta_c = 0.888505 \ln(DC_t + 1)$ $\beta_c = 1.0$ when $D_c = \$2.08/\text{bu}$.

FIGURE 4

Soybeans: Market Price Adjustment Weight (β_s) Versus Difference Between Market and Support Price (D_s)



Note: $\beta_s = 0.59775 \ln(D_{s_t} + 1)$ · $\beta_s = 1.0$ when $D_s = \$4.33/\text{bu}$.

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APPENDIX

The appendix table contains the data for estimating corn acreage response. Much of this information is available through standard USDA sources. However, the origin of some data, particularly on cost and corn policy, requires elaboration.

The series for effective price support and diversion payments for corn were constructed by Houck and others in an analysis of Government commodity policies for the fifties and sixties. The data are extended here for the years covered by the Agricultural Adjustment Act of 1973. This law institutionalized target prices to support corn farmers' returns with direct cash payments—previously, producer returns had been supported solely through the Commodity Credit Corporation loan program. Target prices have generally exceeded loan rates but target price protection has been limited to a percentage of historical base acreages. Thus, corn effective support price for 1973-77 is a weighted average of target price and loan rate—the averaging weight is given by the percentage of planted acreage eligible for target price protection.[1] The 1973 act also extended the authority to initiate setaside programs. However, supplies were short through the 1977 crop year, so this provision was not invoked. Hence, no diversion payments were made in this period.

While commodity cost data are readily available for the inflationary period of the mid-seventies, information from the fifties and sixties requires aggregation of more basic data. Corn and soybean variable cost estimates for recent years (after 1973) are taken from USDA's Cost of Production surveys. Costs in earlier years are measured with a price index of major variable cost items (fertilizer, fuel, and seed) for corn and soybeans.[2] The index was converted to cost per acre units with the common year of data (1974) for costs of production and the price index.

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[1] No target price program has been initiated for soybeans. Producer prices are still supported exclusively through the CCC loan program.

[2] Robert Hoffman (Treasury Department, Office of Raw Materials) graciously provided this information.

Appendix table—Data for corn acreage equation

Year	ACP_t	DPC_t	PFC_t	PSS_t	PMC_{t-1}	PMS_{t-1}	CAC_t	CAS_t	$DV66_t$	$RISK_t$
1954	82,185	0	1.30	2.22	1.48	2.72	58.92	27.31	0	0.005
1955	80,932	0	1.33	2.04	1.43	2.46	58.06	26.25	0	.010
1956	77,828	0	1.11	2.15	1.35	2.22	56.91	25.20	0	.011
1957	73,180	.043	.96	2.09	1.29	2.18	56.27	25.40	0	.012
1958	73,351	.052	.86	2.09	1.11	2.07	56.45	24.83	0	.045
1959	82,742	0	1.12	1.85	1.12	2.00	56.40	24.56	0	.014
1960	81,425	0	1.06	1.85	1.05	1.96	55.87	24.56	0	.013
1961	65,919	.192	.84	2.30	1.00	2.13	56.05	26.33	0	.008
1962	65,017	.192	.84	2.25	1.10	2.28	55.49	25.28	0	.002
1963	68,771	.112	.88	2.25	1.12	2.34	55.39	25.87	0	.005
1964	65,823	.180	.81	2.25	1.11	2.51	55.27	26.54	0	.001
1965	65,171	.180	.81	2.25	1.17	2.62	54.82	27.02	0	.003
1966	66,347	.248	.65	2.50	1.16	2.54	55.18	27.24	1	.001
1967	71,156	.150	.84	2.50	1.24	2.75	54.89	27.56	1	.008
1968	65,126	.241	.68	2.50	1.03	2.49	54.22	27.30	1	.022
1969	64,264	.241	.68	2.25	1.08	2.43	52.11	27.81	1	.004
1970	66,849	.231	.68	2.25	1.15	2.35	53.00	27.80	1	.001
1971	74,055	.160	1.05	2.25	1.33	2.85	57.78	30.77	1	.054
1972	66,972	.260	.89	2.25	1.08	3.03	60.75	32.01	1	.010
1973	71,900	.080	.83	2.25	1.57	4.37	63.51	41.02	0	.124
1974	77,800	0	1.32	2.25	2.55	5.68	88.43	46.34	0	1.128
1975	78,170	0	1.32	2.25	3.03	6.64	91.24	47.54	0	1.131
1976	84,120	0	1.56	2.50	2.54	4.92	86.39	46.98	0	.068
1977	82,740	0	2.00	3.50	2.20	7.32	89.25	48.85	0	.055

CONTRIBUTIONS OF RECENT METRO/NONMETRO MIGRANTS TO THE NONMETRO POPULATION AND LABOR FORCE

By Gladys K. Bowles*

Some 6.2 million, or one-eighth, of the 1975 nonmetro population lived in metro areas 5 years earlier. Metro/nonmetro migrants more than replaced the 5.1 million persons moving in the opposite direction, except among young adults, blacks, and the college educated. In their occupation, industry, and income attributes, migrants did not have a negative impact on the nonmetro population. High proportions were in white-collar occupations and industries, and average income was no less than that of the total nonmetro population. Nor did the nonmetro population suffer in exchanges with metro areas on earning capacity of migrants. Remarkable similarity was noted in the incomes of metro/nonmetro migrants and persons moving in the opposite direction.

Keywords:

Metro/nonmetro
Migrants
Labor force

INTRODUCTION

Some 6.2 million people 5 years old and over who lived in nonmetro localities in 1975 had moved in from metro areas after 1970. They represented about one-eighth of the nonmetro population in 1975 and also about one-eighth of the nonmetro labor force.

This article highlights some characteristics of these people and presents an assessment of their contributions to the nonmetro population and labor force. The data used are based on special tabulations from the March 1975 Current Population Survey (CPS) of the Bureau of the Census and reflect metro designations through 1975 and assigned values for persons for whom mobility status was not reported originally. Thus, they are somewhat different from those published in the *Current Population Reports* (*16*).

CHARACTERISTICS OF THE MIGRANTS

Except for one recent article (*17*), little has been written on the characteristics of the metro/nonmetro migrants, although many people have treated other aspects of the recent nonmetro population and migration turnaround in the United States and other countries (*2-5*, *7-9*, *11*, *13*, *18*, *19*). With the special tabulations from the March 1975 CPS, it is possible to gain a clearer picture of characteristics of this migrant group and to make comparisons with persons in other mobility status categories. Mobility status of each individual 5 years old and over was based on a comparison of place of residence at the time of the survey and 5 years earlier. In this article, *nonmovers* are persons living in the same house in 1975 as in 1970. *Movers* lived in different houses but in the same county at both dates, and *migrants* lived in different counties at the beginning and end of the period.

The vast majority of the metro/nonmetro migrants were whites; only about 6 percent were blacks or persons of other minority races. Neither males nor females predominated among metro/nonmetro migrants. Each sex was just about one-half the total. The median age was 27.3 years and the median years of school completed were 12.6. About 42 percent lived in the South in 1975.[1] The great majority had moved from metro to nonmetro areas within the two broad regions of the country, the South, and the North and West, combined. But about a fifth had moved from one of these broad regions to the other.

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*Gladys K. Bowles is a social demographer with the Economic Development Division, ESCS, stationed at the Institute for Behavioral Research, University of Georgia. This article is a modified version of a paper presented at the annual meeting of the Population Association of America, April 1978, in Atlanta, Georgia. The research reported on is being conducted under Agreement No. 12-17-09-8-1663, between the (former) Economic Research Service, USDA, and the Institute for Behavioral Research, University of Georgia. More information will be presented in a forthcoming report of the Economics, Statistics, and Cooperatives Service and the Institute for Behavioral Research (*6*). The assistance of Jennifer L. Campbell, Teresa D. Cromer, and Sam T. Davis, III, of the Institute for Behavioral Research, in the development of materials on which the article was based is acknowledged. The article is patterned to some extent after the design developed by Anne S. Lee for an article appearing in *Agricultural Economics Research* some years ago which assessed certain aspects of the rural-to-urban migration stream (*10*).

Note: Italicized numbers in parentheses refer to items in the Bibliography at the end of this article.

[1] The South includes Maryland, Delaware, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas. The remaining States, including Alaska and Hawaii, are grouped together in the North and West region.

Although direct information on family migration versus that of single individuals is not available, it is obvious that most of the metro/nonmetro movement involved families or persons who had formed families after moving. The proportions of migrants living alone or with others to whom they were not related was no greater than in the general nonmetro population.

About 5 percent of the males were in the Armed Forces, a higher proportion than in the total nonmetro population. About 75 percent of the males were in the labor force. Of those in the civilian labor force, about 10 percent were unemployed. Nearly 45 percent of the females were in the labor force and 14 percent were unemployed. The labor force participation rate of male metro/nonmetro migrants was higher than that of the larger population they had joined, and the unemployment rate, nominally so. Female newcomers participated in the labor force at about the same rate as other nonmetro women, but a somewhat larger proportion did not hold jobs.[2]

REPLACEMENT OF NONMETRO POPULATION LOST THROUGH OUTMIGRATION

In considering contributions of these migrants, perhaps the first is the extent to which they have replaced or exceeded the number of persons of similar characteristics who left for metro areas.

According to the CPS figures, persons 5 years old and over moving to nonmetro from metro areas between 1970 and 1975 exceeded by 1.1 million the number moving away (table 1). People moving to the nonmetro areas more than offset the metro-directed losses of whites, but replaced only three-fourths of the blacks. Losses were exceeded to about the same degree among males and females and among persons living in each of the two broad regions of the country. For those moving within the South, the losses were offset less than in the North and West. Inter-regionally, metro areas of the South gained at the expense of the nonmetro North and West and nonmetro areas of the South also gained at the expense of the metro North and West:

Movement	Number
South metro to North and West nonmetro	405,000
North and West nonmetro to South metro	544,000
Net gain by Southern metro	139,000
South nonmetro to North and West metro	557,000
North and West metro to South nonmetro	937,000
Net gain by Southern nonmetro	380,000

Numbers of people involved in the metro/nonmetro exchanges and degree of replacement varied considerably by age. While young adults, 18-34 years, led in each stream (2.5 million to nonmetro and 2.7 million to metro), they were only two-fifths of those moving to nonmetro areas compared with over half those moving away. This fact was true partly because only three-fourths of the loss of young adults, 18-24 years, was replaced, although at every other age category shown in table 1, losses were more than offset.

As has been pointed out by others, retirement has influenced nonmetro migration and population turnaround (*4*). Persons aged 55 and over exceeded those who had moved in the opposite direction to a somewhat greater extent than at other ages. Even so, they were under-represented in the nonmetro population of these ages in 1975. Although metro/nonmetro migrants had a nominally higher median age than those moving in the opposite direction (25.4), the former group nonetheless had a larger percentage of children under age 18. Metro/nonmetro movers were disproportionately weighted with both children and persons aged 55 or over.

Indexes of dissimilarity indicate that, in their distribution among the age categories, metro/nonmetro migrants were most like other people of metro origin who either moved or migrated between 1970 and 1975 (figure).[3] They were least like people who had not moved at all, either metro or nonmetro, and next least like the migrants in the opposite stream.

Metro/nonmetro migrants were somewhat less well educated than persons in the opposite stream. A smaller number had college experience and a larger number had less education. Another researcher has pointed out an interesting interaction of age and education:

> At ages 18-24, there is a strong preponderance of movers with a high school education or less in the metropolitan-to-nonmetropolitan stream, and an equally strong preponderance of 1 to 3 years of college and 4 years or more of college in the opposite stream. This supports the suggestion that a portion of the educational differential in these two streams is due to the migration of two-year and four-year college graduates into SMSA's after completion of education in nonmetropolitan colleges (*17*).

Metro/nonmetro migrants were most like other people of metro origin who had moved or migrated within SMSA's. People moving from one SMSA to another were generally better educated. They were least like nonmetro-origin people who did not move or who had moved to a

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[2] Tests for significance were made at the 2.0 and 1.6 standard error levels following procedures recommended by the Bureau of the Census for the March 1975 Current Population Survey. In comparative statements, the word "nominally" is used if the difference was statistically significant at the 1.6 but not at the 2.0 level.

[3] Indexes of dissimilarity measure the extent to which mobility categories differ (or are similar) on their percentage distributions on given characteristics (*12*). When two distributions are very much alike, the index is close to zero.

Table 1—Exchanges between metro and nonmetro areas, by selected characteristics, 1970-75

Characteristic	Metro to nonmetro migrants	Nonmetro to metro migrants	Net	Ratio
		1,000		
Total, 5 years old and over	6,217	5,074	1,143	1.23
Whites	5,865	4,611	1,254	1.27
Negro and other races	352	463	-111	.76
Males	3,065	2,501	564	1.23
Females	3,152	2,573	579	1.23
South	2,625	2,140	485	1.23
North and West	3,592	2,934	658	1.22
Within the South	1,687	1,596	91	1.06
Within the North and West	3,187	2,377	810	1.34
South to North and West	405	557		
North and West to South	937	544	(See the text)	
Age (years):				
5-14	1,407	961	446	1.46
15-17	331	211	120	1.57
18-24	925	1,295	-370	.71
25-34	1,589	1,434	155	1.11
35-44	742	454	288	1.63
45-54	415	332	83	1.25
55-64	416	178	238	2.34
65 and over	393	208	185	1.89
Total, 18 years old and over	4,479	3,902	577	1.15
Elementary school	571	411	160	1.39
High school 1-3 years	732	445	287	1.64
4 years	1,654	1,344	310	1.23
College 1-3 years	746	777	-31	.96
4 years	497	604	-107	.82
5 years and over	279	321	-42	.87
	Years			
Median age	27.3	25.4		

Source: Special tabulations made from the Bureau of the Census March 1975 *Current Population Survey* for cooperative research of ESCS and the University of Georgia.

different house but stayed in the same county, who were somewhat less well educated.

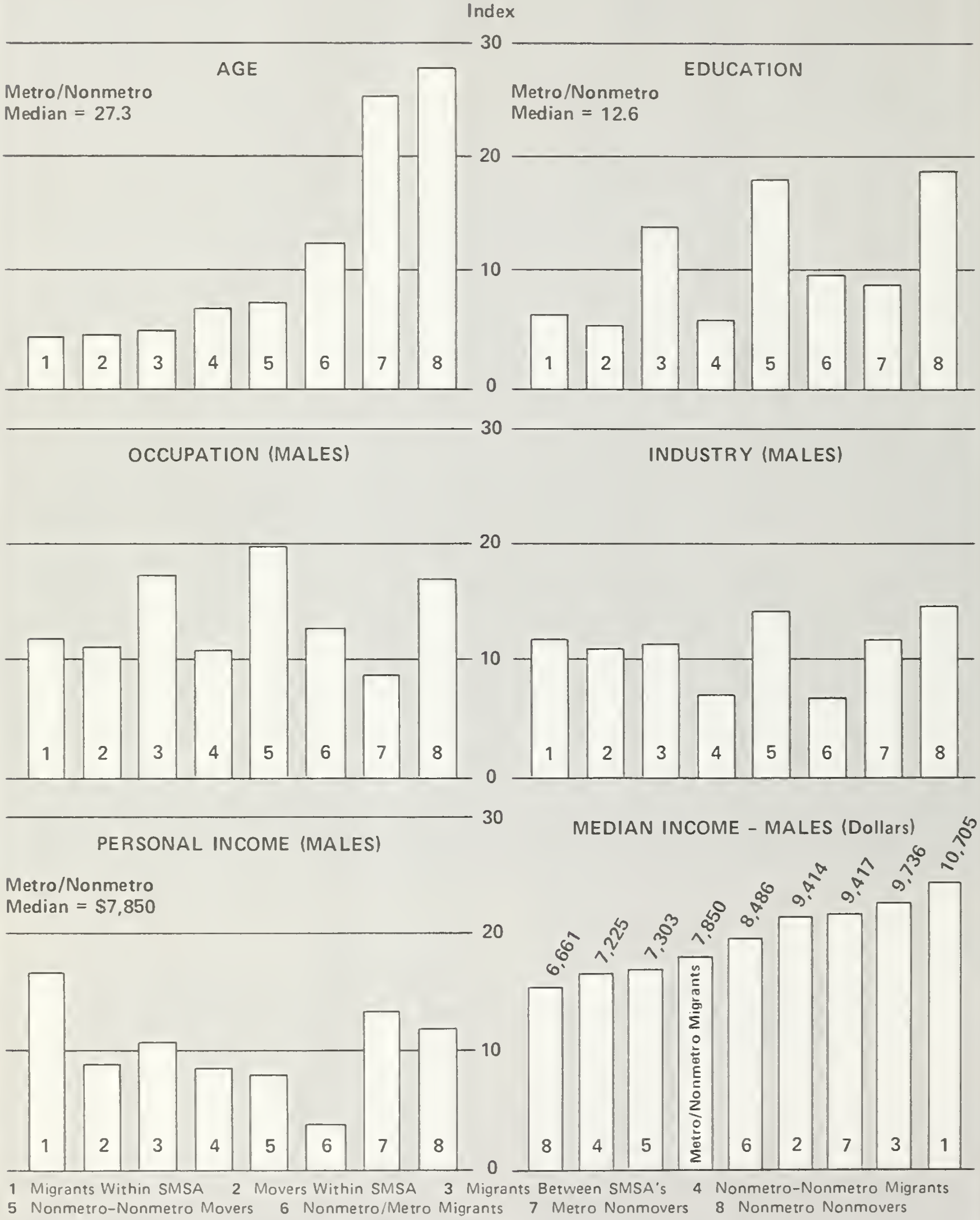
CONTRIBUTIONS TO NONMETRO OCCUPATIONS AND INDUSTRY

Just over two-fifths of the employed white male metro/nonmetro migrants were in white-collar occupations and two-fifths were in blue-collar jobs (table 2). About a tenth worked in service occupations and the remainder were in farming. White male migrants were over-represented in white-collar and service occupations and under-represented in blue-collar and farm-work compared with the overall nonmetropolitan population. About one-fifth of the nonmetro males with a professional, technical, and sales jobs were recent newcomers from metro areas.

Over two-thirds of the employed white female metro/nonmetro migrants held white-collar jobs, a considerably higher proportion than among all nonmetro women. One-fifth were in the service occupations, not too different from nonmetro women in general. One in ten had blue-collar employment, considerably below the rest of the employed nonmetro women.

Among the industry categories, as would be expected from the above information, over-representation existed in industries primarily employing white-collar people (table 3). These were finance, insurance, and real estate, and, for white males, professional services. Men were under-represented in the extractive industries and manufacturing. Women metro/nonmetro migrants were

A Comparison of Metro/Nonmetro Migrants and Other Migrant and Nonmigrant Groups (Index of Dissimilarity)*



*The lower right-hand block shows median income rather than indexes of dissimilarity.

under-represented in these industries, also, and in transportation, communications, and related industries.

In industrial employment, male metro/nonmetro migrants were most similar to other persons in the nonmetro population who had moved away from their origin county either to another nonmetro county or to a metro county. They were less similar to the nonmetro-origin population who were still in their origin county in 1975. This latter group includes most of the men engaged in farming and the other extractive industries, where metro/nonmetro migrants were under-represented. But in industrial employment, they were more similar to these nonmetro people who had not moved than to most of the migrants and movers in the metro-employed population.

Male metro/nonmetro migrants were most similar in their occupational attachments to men in the metro population who had not moved. They were next most similar to nonmetro men who had moved from their home county to another nonmetro area or to a metro area. In their occupational attachments, women metro/nonmetro migrants were closest to women in the opposite stream and to nonmetro migrants. They were least like the nonmetro people who were living in the same county in 1975 as in 1970, both movers and nonmovers. In their distribution among the industry categories, they were closest to nonmetro migrant women and least like nonmetro movers and nonmovers, as they had been on occupations.

Although estimates for blacks and other minorities are included in the tables, the numbers of metro/nonmetro migrants are so small that analysis is not included here. About three-fifths of the men were in blue-collar or service jobs, and the women were mainly in white-collar or service jobs.

INCOME CHARACTERISTICS

Metro/nonmetro migrants generally did not earn less income than the nonmetro population they had joined. The median for men migrants earning income in 1974 appears higher than that of other men in the nonmetro

Table 2—Nonmetropolitan population and 1970-75 metro/nonmetro migrants 16 years old and over, by race, sex, and major occupation, 1975

Race and major occupation group	Males			Females		
	Nonmetropolitan population, 1975	Metro/nonmetro migrants, 1970-75		Nonmetropolitan population, 1975	Metro/nonmetro migrants, 1970-75	
	1,000	*1,000*	*Percent*	*1,000*	*1,000*	*Percent*
White:						
Total employed, 16 years old and over	12,460	1,498	12.0	7,555	849	11.2
Professional, technical, and kindred workers	1,325	277	20.9	1,137	188	16.5
Managers and administrators, except farm	1,575	208	13.2	366	58	15.8
Clerical and kindred workers	550	60	10.9	2,148	253	11.8
Sales workers	599	109	18.2	539	69	12.8
Crafts and kindred workers	2,652	305	11.5	128	10	7.8
Operatives, except transport equipment	1,654	144	8.7	1,041	63	6.1
Transport equipment operatives	790	63	8.0	55	3	*
Laborers, except farm	958	99	10.3	124	13	10.5
Service workers	836	135	16.1	1,814	181	10.0
Farm operators	1,051	45	4.3	49	3	*
Farm laborers	471	53	11.3	153	8	5.3
Negro and other races:						
Total employed, 16 years old and over	888	54	6.1	683	55	8.1
Professional, technical, and kindred workers	32	2	*	62	14	*
Managers and administrators, except farm	17	5	*	12	2	*
Clerical and kindred workers	6	4	*	59	7	*
Sales workers	7	4	*	20	1	*
Crafts and kindred workers	158	14	8.9	6	0	*
Operatives, except transport equipment	129	3	2.3	169	8	4.7
Transport equipment operatives	95	5	5.3	4	2	*
Laborers, except farm	203	4	2.0	3	0	*
Service workers	112	7	6.2	337	21	6.2
Farm operators	44	0	*	0	0	*
Farm laborers	84	5	6.0	8	0	*

*Base less than 75,000.

Source: See table 1.

Table 3—Nonmetropolitan population and 1970-75 metro/nonmetro migrants 16 years old and over, by race, sex, and major industry, 1975

Race and major industry group, 1970-75	Males			Females		
	Nonmetropolitan population, 1975	Metro/nonmetro migrants, 1970-75		Nonmetropolitan population, 1975	Metro/nonmetro migrants, 1970-75	
	1,000	*1,000*	*Percent*	*1,000*	*1,000*	*Percent*
White:						
Total employed, 16 years old and over	12,460	1,498	12.0	7,555	849	11.2
Agriculture, forestry, and fisheries	1,634	108	6.6	258	14	5.4
Mining	397	48	12.1	21	2	*
Construction	1,229	150	12.2	65	12	*
Manufacturing	3,221	327	10.2	1,347	95	7.1
Durable goods	2,000	200	10.0	530	37	7.0
Nondurable goods	1,221	127	10.4	817	58	7.1
Transportation, communications, and so on	976	117	12.0	203	12	5.9
Wholesale and retail trade	2,209	288	13.0	1,801	225	12.5
Finance, insurance, and real estate	359	70	19.5	380	61	16.1
Business and repair services	607	88	14.5	785	83	10.6
Professional services	1,164	212	18.2	2,385	317	13.3
Public administration	665	90	13.5	310	27	8.7
Negro and other races:						
Total employed, 16 years old and over	888	54	6.1	683	55	8.1
Agriculture, forestry, and fisheries	137	5	3.6	8	0	*
Mining	10	0	*	0	0	*
Construction	89	10	11.2	5	0	*
Manufacturing	299	12	4.0	175	10	5.7
Durable goods	172	4	2.3	43	5	*
Nondurable goods	127	8	6.3	132	5	3.8
Transportation, communications, and so on	67	6	*	11	4	*
Wholesale and retail trade	128	7	5.5	79	3	3.8
Finance, insurance, and real estate	10	2	*	4	0	*
Business and repair services	32	1	*	192	13	6.8
Professional services	78	8	10.3	190	26	13.7
Public administration	38	3	*	19	0	*

*Base less than 75,000.

Source: See table 1.

population (but this difference was not statistically significant in terms of the CPS sample). The median for women in each group was about the same:

Status	Median income in 1974	
	Men	Women
	Dollars	
Nonmetro population	7,072	2,620
Metro/nonmetro migrants	7,850	2,650
Nonmetro/metro migrants	8,486	3,313

While the median income for males moving in the opposite direction appears somewhat higher than that of metro/nonmetro males, the difference was not statistically significant. The indexes of dissimilarity also indicate that the two groups were distributed very similarly among income classes. About the same proportions of men moving between metro and nonmetro areas, whatever the direction, earned low, medium-sized, and high incomes. They ranked between their populations of origin and destination, as is often the situation of migrants moving from one type of environment to another (see figure, median income block).

Metro/nonmetro migrant men were considerably closer on their distribution among the income categories to other nonmetro movers and migrants than they were to nonmovers in this population (see figure, index block). More nonmovers' incomes were in the lower brackets. Compared with the population they left, these male migrants had incomes closer to people who had moved in their original SMSA county than to SMSA migrants or nonmovers. The median income of women metro/nonmetro migrants, although apparently lower (as reported in the CPS), did not differ statistically from that of women moving in the opposite direction. Their income distribution most resembled that of nonmetropolitan women who had not moved between 1970 and 1975.

CONCLUSION

Metro/nonmetro migrants more than replaced persons moving in the opposite direction, except among young adults, blacks, and persons with college education. They more than replaced persons who were high school graduates or had less education, but did not completely cover the loss of persons with some years of college. Replacement was nominally higher among people remaining within the North and West than in the South, but in the regional exchanges, the South gained at the expense of the rest of the country.

In terms of occupation, industry, and income attributes, metro/nonmetro migrants have not had the negative impact on the nonmetro population that some people feared would occur. Although a higher proportion of migrants were unemployed in 1975, there was over-representation among the employed in the white-collar occupations and industries. On the average, migrants' income was no less than that of the nonmetro population as a whole and it may actually have been somewhat higher. Moreover, the nonmetro population appears not to have suffered in the exchange of population as far as in earning capacity of migrants. There was remarkable similarity in the income distributions among metro/nonmetro migrants and persons who had moved in the opposite direction.

It is indeed fortunate that the more positive impacts predominate in the movement of people to nonmetro areas. The most recent bulletins of the Census Bureau indicate that the pattern of more people moving to than away from nonmetro areas is continuing (*14*, *15*). And, Calvin Beale, demographer with ESCS, said recently to the House Select Committee on Population, he believed that, "the net flow of people to the South and West and to the rural areas will continue to be seen in the 1980's" (*1*).

Even if the pattern reverses eventually as far as the net result is concerned, investigations of the exchange of population between the highly urbanized and rural populations should continue. There will always be large numbers of people moving in either direction between metro and nonmetro areas. Their characteristics and the impact of their movement on the populations they left and joined merit continuing attention.

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In Earlier Issues

In spite of the fact that we live in a universe of law and order, fluctuations in both weather and crop yields, whether short- or long-range, are almost universally looked upon as matters of chance. Practically all statistical studies that have raised the question of regularity in fluctuations in crops and weather conclude negatively; that is, they find that fluctuations of crops and weather are essentially similar to what might be expected in series of random numbers. My observations with regard to the existence of trends and patterns in both monthly and yearly data make it difficult to accept this common attitude.

Louis H. Bean
p. 24

Based on several standard tests, yields of corn after allowing for trend, give no evidence of departing significantly from a random series. However, using the same tests, a constructed series based essentially on a regular pattern superimposed on a regular cycle also gave no evidence of significant departures from a random series. The pattern used for the constructed series resembles those which Bean believes he has found in crop-yield series. Thus, the standard tests do not appear to be sensitive in distinguishing between a random series and one made up of repeating patterns.

Richard J. Foote
p. 30

Vol. III, No. 1, Jan. 1951

BENEFITS TO AGRICULTURAL WORKERS UNDER THE UNEMPLOYMENT COMPENSATION AMENDMENT OF 1976

By G. Joachim Elterich*

The "Unemployment Compensation Amendments of 1976" are expected to provide income protection for about two-fifths of all hired agricultural workers. The program became effective in January 1978. Of these insured workers, three-tenths are expected to receive benefits, expected to average about 14 percent of average annual earnings if 1970 employment relationships hold. Nearly one-fourth of unemployed farm workers who receive benefits will likely exhaust their entitlements before finding new jobs. Large interstate variations are expected around these averages as a result of differing State qualifying regulations, benefit schedules, and personal work histories.

Keywords:

Unemployment insurance
Agricultural labor
Economic welfare

In January 1978, under P.L. 94-566, Unemployment Insurance (UI) coverage was extended to agricultural workers in establishments employing 10 or more workers for 20 weeks or more, or with a quarterly payroll of at least $20,000. Recent studies of the impact of the law on agricultural employers and trust funds found:

> Only about six percent of all agricultural (five percent of farm) employers will be affected by the law, and these employers cover about half of all agricultural workers. A somewhat smaller proportion of the employment will remain covered under the UI law while between one-third and one-half of the payroll will be covered in most states. Throughout the states, wide variations in these employment characteristics exist among employers subject to the law among economic classes, and types and ownership of farms. A small proportion (10-20 percent) of employers, representing predominantly the farms with high sales volumes and highly seasonal operations (such as vegetable, fruit, tobacco and miscellaneous farmers) would generally cover half to three-fourths of the work force on these types of farms. In the area studied—which includes the New England states, New York, New Jersey, Pennsylvania, Ohio, Delaware, West Virginia, Maryland, Florida and Texas—less than two percent of the cash grain, dairy, livestock and cotton farmers will cover less than 15 percent of the workers on these farms. The estimated agricultural benefits paid will usually constitute less than one percent of all UI benefits disbursed in a state (*6*, *4*, *8*).[1]

Under the employment compensation program, eligible workers are provided with partial income protection should they become unemployed with cause. Only those working for employers subject to the law are eligible to receive benefits. They must meet the following additional conditions. Unemployment for UI purposes is defined in monetary and nonmonetary terms. To qualify monetarily, a worker must show "substantial attachment" to the covered labor force, either for a sufficient number of weeks or its equivalent in earnings. The specific terms differ by State.[2] To qualify in nonmonetary terms, a worker must be available for work on a job similar to that in which he or she is usually employed, be able to work, and must not be discharged for good cause, or leave work voluntarily. In addition, he or she must make a valid claim for benefits. A worker's benefit rights—beneficiary status and benefit amounts—depend on weeks of work and wage experience in covered employment during the base period. States have different provisions (benefit schedule) for determining the worker's benefit rights as to the *weekly* benefit amounts and the *duration*.

METHODS

The study reported on here used workers' employment histories and their characteristics as of 1969/70

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[1] Italicized numbers in parentheses refer to items in References at the end of this article.

[2] For analysis of the qualifying provisions and benefit schedules of workers in different States, see (*2*).

obtained in the NE-58 research, which surveyed a stratified (by payroll), random sample of agricultural employers in the 15 States previously named. In the second sampling frame, the employers' workforce was randomly selected. The workforce was completely or proportionately sampled, depending on its size. The sample data were subsequently expanded to provide population estimates.[3]

Each worker's 52-week base period, also used as benefit period, was analyzed with respect to his UI beneficiary status: that is, if the worker was covered and/or insured, and/or beneficiary or benefit exhaustee. Only workers employed by employers included by the provision as defined by P.L. 94-566 (the "10 in 20 or $20,000" provision) were considered covered. The State's qualifying and benefit determination status in effect July 1971 was applied. The 1971 price level applies to monetary statistics.

The tabulations and analyses of the estimated impact of the law on the UI and workforce classifications of 14,818 workers in the survey States will relate the relative coverage of their expanded population (148,925) due to covered survey employers.

Actual benefits would be paid to workers assuming they had the same unemployment experience in the second (benefit) year as in the first (base) year and disregarding extended benefits beyond the State's statutory limit. The analysis disregards seasonality provisions, which are currently still in effect in some States; dependency allowances; and any changes in labor supply due to the extension of coverage to agricultural workers. Estimates are based on the assumption that workers apply for benefits in the same State in which they were interviewed, which will not invalidate the estimates.

By taking this approach and population, the study assumes the same employment and work history of agricultural employers and their employees both in 1971 and also 1977 as the survey has not been updated. However, it is asserted that any change which may have occurred since then would change the findings only slightly. On average, both workers' taxable wages and the UI benefits have increased approximately proportionately. At the same time, the level of employment has remained constant or increased somewhat in most States and the number of employers with sufficient employment to qualify for coverage has remained constant or increased. Thus all factors tend to counteract each other. The seasonal employment pattern is judged to remain essentially similar.

The chart reviews the steps involved in determining UI coverage, steps defined in the next section of this article. Later sections examine potential and actual benefits and assess the impact of payments on economic welfare of workers.

COVERAGE AND BENEFICIARY STATUS

Covered Workers

Agricultural workers may become eligible to receive benefits when unemployed if they worked for an employer who hires at least 10 workers over a 20-week period, or who has a high-quarter payroll of at least $20,000. Overall, just over half of all hired farmworkers of employers in the study area are covered. The variations in size of employing units (as measured by size of workforce) and the duration of employment result in wide variations of worker coverage among States (table 1).

Workers with only nonfarm work have a greater chance of being covered (64 percent) than workers with only farmwork or with a combination of farm and nonfarm work (about 50 percent). The reason for this likelihood is that nonfarm employers are almost universally covered under existing UI legislation. Of the farmworkers, interstate workers have the highest coverage (61 percent) because they are more likely to be employed by larger employers. By contrast, less than half of the intrastate farmworkers are covered (47 percent).

Insured Workers

Of the farmworkers employed on covered farms, those in the labor force all year are most likely to qualify as insured workers (94 percent). Those in the labor force part of the year are least likely to qualify (64 percent). The variation among States is narrow for workers in the labor force all year (86-99 percent), while it is rather wide for workers with only part-year workforce participation (29-90 percent). This latter group is composed mostly of students and housewives.

The difference in the proportion of insured workers between the interstate (82 percent) and intrastate (88 percent) farmworkers is relatively small for the study area. Because intrastate work is predominantly seasonal, in most States, the proportion of covered intrastate workers who qualify for UI is smaller than for interstate workers.

Both groups display wide variations among States (from 52 to over 90 percent). The interstate differences in incidence of insured workers can be attributed to both the State's qualifying requirements and the personal work histories (duration of work and earnings). In Florida and Ohio, stringent requirements for worker earnings and workforce participation could result in relatively lower proportions of insured workers. However, the proportion is high in Florida; covered workers generally have been employed longer and thus have higher annual earnings. In Ohio, West Virginia, and most

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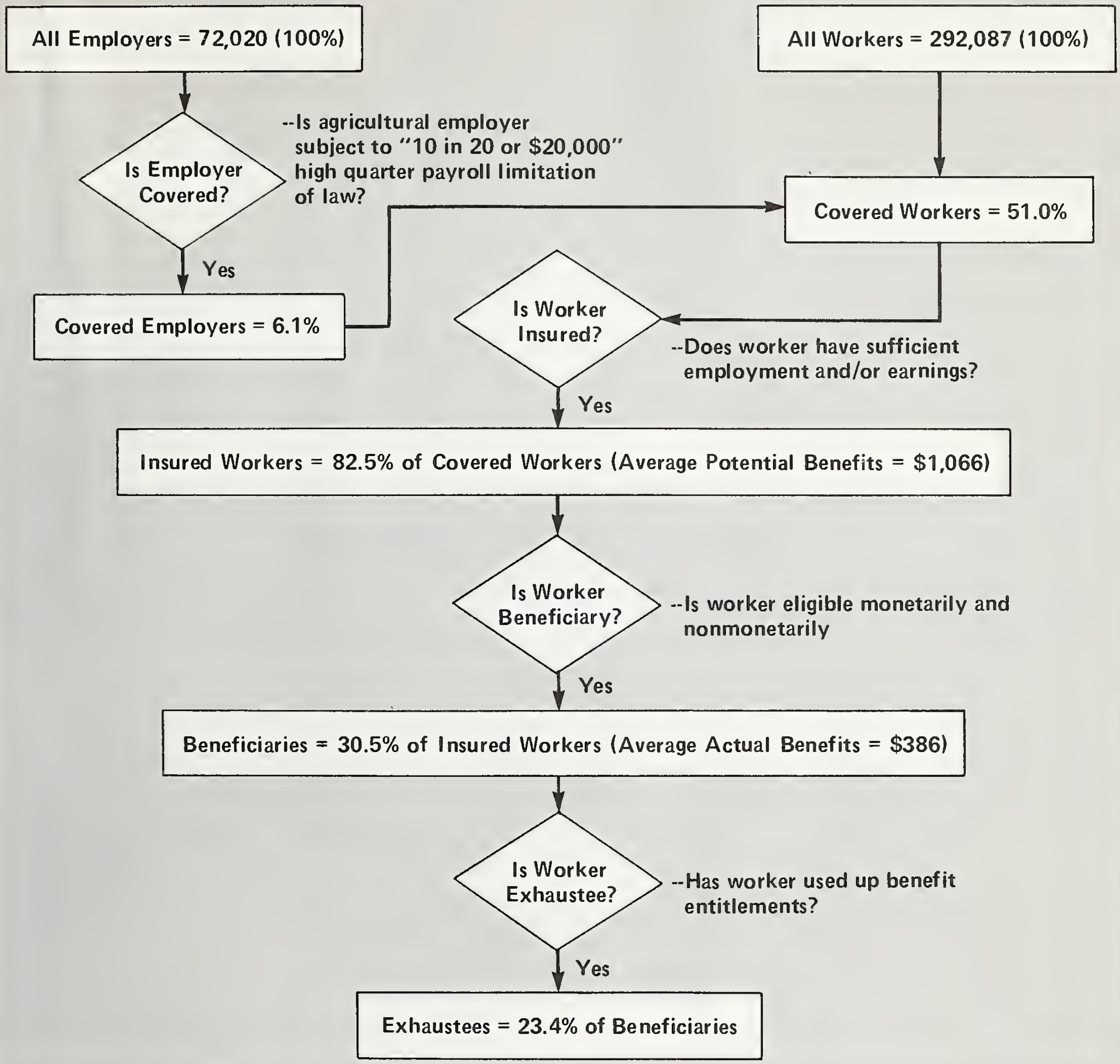
[3] For more detail on methods, survey and sampling procedures, and results of the original study, see (*1*, *9*, *3*).

Eligibility for Unemployment Insurance Coverage and Benefit Determination Under P.L. 94-566, 15-State Study Area


All Employers = 72,020 (100%)
All Workers = 292,087 (100%)
Is Employer Covered?
--Is agricultural employer subject to "10 in 20 or $20,000" high quarter payroll limitation of law?
Yes
Covered Employers = 6.1%
Covered Workers = 51.0%
Is Worker Insured?
--Does worker have sufficient employment and/or earnings?
Yes
Insured Workers = 82.5% of Covered Workers (Average Potential Benefits = $1,066)
Is Worker Beneficiary?
--Is worker eligible monetarily and nonmonetarily
Yes
Beneficiaries = 30.5% of Insured Workers (Average Actual Benefits = $386)
Is Worker Exhaustee?
--Has worker used up benefit entitlements?
Yes
Exhaustees = 23.4% of Beneficiaries

New England States, a fairly large share of the workforce is part time (mainly housewives and students). This is evident from the small proportion of insured workers (due to low earnings and short spans of work) even though qualifying requirements are relatively low.

The proportions of insured workers doing farmwork only or performing both farm and nonfarm work is about 84 percent for the study area. This figure is slightly larger than the 71 percent of those performing nonfarm work; however, wide interstate variations exist.

Actual Beneficiaries

Actual beneficiaries are insured workers with at least one period of compensable unemployment and who are thus assumed to receive UI benefits. For the study area, about 3 of 10 insured workers are expected to receive UI benefits (table 1). Again, wide variations exist among States.

The proportion of actual beneficiaries is likely to be highest for insured farmworkers in the labor force part

Table 1—Covered and insured workers, beneficiaries, earnings, potential and actual benefits per beneficiary under provisions of P.L. 94-566, by migratory status, labor force participation, type of work, study area, 1970

Item	Farmworkers with some farmwork						Workers with nonfarm work only[1]	All workers
	Intra-state	Inter-state	In labor force part year	In labor force all year	Farm work only	Farm and nonfarm work		
				Percent				
Covered workers[2]	46.7	61.3	52.2	49.0	50.2	49.7	63.5	51.0
Insured workers[3]	82.1	87.6	63.6	93.7	83.5	84.2	71.1	82.5
Beneficiaries[4]	25.9	41.5	78.3	14.2	28.6	37.8	31.1	30.5
				Dollars				
Potential benefits	1,071	1,035	832	1,138	1,056	1,075	1,141	1,066
Actual benefits	395	365	387	374	379	393	421	386
Earnings of covered workers	3,676	3,374	2,006	4,383	3,601	3,564	3,822	3,613
Earnings of beneficiaries	2,625	3,049	2,718	2,931	2,724	3,002	3,452	2,843

[1] Worked on farms during survey, but had no farmwork during preceding year so could not qualify as covered farmworkers. [2] Proportions are based on the corresponding number of workers for each classification under the universal coverage. [3] Insured workers as a percentage of covered workers. [4] Beneficiaries as a percentage of insured workers.

Source: For disaggregated State-level data for the study area, see (*7*).

of the year (78 percent) and lowest for those in the labor force year-round (14 percent). Insured intrastate workers have a lower incidence of actual beneficiaries (26 percent) than interstate workers (42 percent).

Exhaustees

Benefit exhaustees are beneficiaries whose weeks of unemployment equal or exceed their allotted duration. Their proportion is based on the number of beneficiaries, a statistic only available by State, and this number cannot be computed for the 15-State area. About one out of four beneficiaries in the 1970 sample would have exhausted their benefits under the new law. The figure for the mid-Atlantic States is about 9 percent; in New England, Texas, and Florida, it rises to about 29 percent. The interstate differences cannot be explained by the State statutes alone, although Florida and Texas provide relatively short durations for benefits. Differences are also determined by the employment histories of the workers in a State.

BENEFITS

Potential

Potential benefits are the maximum amount to which an unemployed insured worker is entitled, based on work history during the base period. They are the product of the weekly benefit amount computed from the worker's past wages, and the potential duration of weekly benefits according to the State law.[4]

Average potential benefits per insured worker would have amounted to $1,066 (table 1). Intrastate workers qualify for slightly higher benefits than interstate workers ($1,071 versus $1,035). Workers doing nonfarm work only would qualify for the highest benefits, $1,141, while those doing farmwork only would qualify for $1,056. Workers in the labor force all year potentially qualify for larger benefits than those in the labor force part of the year ($1,138 versus $832).

Variations of potential benefits within a classification are much larger among States than within a State. Differences among groups within a State are due to variations in earnings only.

Actual

Average actual benefits that would have been paid per beneficiary amounted to $386 in the study area (table 1). They result from the weekly benefit amount and duration of weeks of compensable unemployment. The weekly benefit is determined by a worker's wages based on the State's provisions. Each State limits the duration for weekly claims.

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[4] See footnote 2.

Comparing average weekly benefit amounts and average durations among States allows insights into the origin of the variation among States. For example, low average actual benefits in Florida and Texas might be partly attributed to low weekly benefit amounts, but they are largely due to very restrictive provisions on benefit duration. West Virginia has a relatively long potential benefit duration but has the lowest weekly benefit amounts of the survey States. On the other hand, high average actual benefits in Rhode Island and New Jersey are due mainly to higher weekly benefit amounts. In Vermont, the high benefits are mainly due to uniform duration, despite low weekly benefit amounts. For a discussion of the interrelationships, see (*2*, pp. 33-72).

Farmworkers in the labor force all year, and those who perform both farm and nonfarm work, are expected to have slightly higher weekly benefit amounts, compared with their complementary groups, but a lower actual duration.

IMPACT OF UI PAYMENTS ON ECONOMIC WELFARE

Annual earnings tend to be lower for actual beneficiaries than other covered workers because they have longer periods of employment. From an income maintenance perspective, the combined income (earnings plus UI benefit payments) of those workers who experience periods of compensable unemployment is of primary concern. The overall average earnings of beneficiaries in the study area amounted to $2,843 (compared with $3,613 for all covered workers including beneficiaries (table 1)). Benefits averaged $386 for these workers, so the combined income of beneficiaries was less than the average earnings of all covered workers. (More detailed information is contained in (*5*)).

The actual benefits as a proportion of annual earnings of beneficiaries indicate the impact of UI on the economic well-being of these workers. Benefits averaged 14 percent of earnings (table 2). Because of shorter

Table 2—Actual benefits and annual earnings for beneficiaries, study area, 1970[1]

Region or State	Farmworkers with some farm work						Workers with nonfarm work only	All workers
	Intra-state	Inter-state	In labor force part year	In labor force all year	Farm work only	Farm and nonfarm work		
Study area: [2]								
Benefits	15.0	12.0	14.2	12.8	13.9	13.1	12.2	13.6
Earnings	2,625	3,049	2,718	2,931	2,724	3,002	3,452	2,843
Mid-Atlantic: [2]								
Benefits	17.0	13.2	14.2	12.8	14.0	15.7	11.6	14.2
Earnings	2,822	3,164	2,978	3,079	3,054	2,985	3,795	3,102
New England: [2]								
Benefits	23.0	21.1	22.4	21.3	25.7	17.0	12.3	20.6
Earnings	2,165	2,473	2,175	2,701	2,136	2,536	3,330	2,410
Florida: [2]								
Benefits	13.2	7.4	12.2	9.0	11.8	8.6	14.1	11.4
Earnings	2,600	3,305	2,771	2,881	2,721	3,179	3,162	2,825
Ohio: [2]								
Benefits	16.3	19.4	16.6	19.4	16.9	19.5	9.2	16.9
Earnings	2,835	2,214	2,566	2,471	2,513	2,570	3,007	2,556
Texas: [2]								
Benefits	13.5	10.1	13.5	10.4	12.6	12.2	10.6	12.3
Earnings	2,786	3,095	2,783	3,067	2,660	3,410	3,699	2,941
Study area[3]	37	35	47	33	36	37	37	36
Study area[4]	51	38	47	41	47	41	43	45

[1] Data for individual States not shown are in (*7*). [2] Actual benefits as proportion of annual earnings for beneficiaries. [3] Benefits as percentage of average potential benefits of all insured workers. [4] Benefits as percentage of average potential benefits of all beneficiaries.

Note: Benefits are percentages; earnings are dollars.

actual durations of benefits in Florida, these workers would have added only about 11 percent of their earnings, while workers in Massachusetts would have added nearly 24 percent to theirs. Intrastate workers showed a greater relative improvement than interstate workers (15 versus 12 percent).

About 36 percent of the maximum possible benefits would have been collected by beneficiaries in the study area; few States and worker classifications would fall outside the 30-40 percent range. Beneficiaries in the labor force part of the year would have drawn nearly half the potential benefits of insured workers, while those in the labor force all year would have received only one-third. The proportion of actual benefits to potential benefits of beneficiaries amounted to only 45 percent for the study area.

CONCLUSIONS

Over four out of five covered farmworkers would be insured, according to the simulation. About one out of three insured workers would be a beneficiary, and nearly one out of four beneficiaries would exhaust the entitlement. For the study area, average potential benefits of insured workers and actual benefits of beneficiaries would have amounted to $1,066 and $386, respectively. UI benefits are estimated to have been 14 percent of beneficiaries' earnings. The benefits could have more than doubled if beneficiaries had sufficient eligible unemployment to exhaust entitlements under State laws. Effects of the amendment constitute a significant contribution towards the income maintenance of seasonal farmworkers.

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THE POTENTIAL FOR ECONOMICS RESEARCH

By Clark Edwards*

Realizing the potential for economics research depends on the successful completion of several interdependent tasks:

- A problem is identified,
- Data related to the problem are collected,
- Description transforms data into useful information,
- Theory is brought to bear so that the problem can be understood and analyzed,
- Explanation involves interaction between data and theory in order to make clear that which needs to be understood,
- Prescription points to actions which can alter the course of events and deal with the problem.

Keywords:

Policy
Methodology
Research
Data
Theory

Researchers in economics seek to describe and explain certain social problems and to prescribe remedies based on available data and theory. For the potential of economics research to be realized, tasks must be performed relating to six areas: problems, data, description, theory, explanation, and prescription. Together, these six represent a framework for understanding what researchers do, but do not make clear how they do it. Such clarification would be the subject of a paper on scientific method. My purpose here is to illuminate the six elements.

In the discussion, each area is treated independently as an expository device. In use, the six tasks are interdependent. A researcher may specialize and become an expert practitioner of any one of the six tasks without necessarily acquiring facility in the other five. However, the potential for economics research is realized only when the six tasks are performed in balance, either by the researcher or by a team.

PROBLEM

Economics research does not make sense to me unless it seeks solutions to social problems. Some readers may find this remark obvious and trivial. Others of you may object because you see reasons for engaging in research other than solving problems. You may argue that only applied research involves problem solving, and that basic research can have other purposes, such as satisfaction of curiosity or knowledge for its own sake. Or, you might contend that research is not always necessary and could be an encumbrance—that many economic problems are resolved adequately and appropriately without research. If so, our differences of opinion about the potential for economics research may stem more from the meanings we attach to words such as "problems," "useful," and "research" than from an underlying conflict of opinion.

A far more disconcerting objection—that research often is not useful to problem solvers—has been raised in the economics literature by calling attention to the extensive body of published research that has not proven useful for solving relevant problems (*12*).[1] However, unused research may simply represent failure to help solve a problem rather than evidence of an alternative purpose.

It is not necessary to become an economist or an economics researcher before developing interest in economic problems. All concerned citizens are interested in the ways society and individuals cope. Let us look at two examples of people dealing with economic problems centuries before economics was established as a discipline.

Xenophon wrote one of the first economic tracts over 2,000 years ago (*22*). The problem he addressed, household management, is comparable today to that of maximizing the welfare of members of an agriculturally-oriented commune. At about the same time, Aristotle brought several economic issues into focus (*1*). He maintained that a cultivated, leisure class would be more likely to achieve the good life in a relatively small city-state than in an extensive empire. He supported private property in preference to communal property. He condoned the slave economy on the dubious grounds of natural inequalities among men. Aristotle defended the farmer who fed the leisure class while attacking the money lender who exploited it. And he addressed the problem of natural or fair market prices.

Since economics came into its own as a discipline some 200 years ago, considerable attention has been given to defining its scope; there has been much argument about which social problems belong to economics and which to other sciences. Within economics, problems have been subclassified further among the various subdisciplines of the science as illustrated below.

Macroeconomists study inflation, unemployment, growth, and international balance of payments. Microeconomists examine prices and quantities for various commodities and resources; labor economists, employment, wages, and working conditions; land economists, availability and use of natural resources. Management economists concentrate on profit maximization strategies for firms, while consumer economists focus on allocation of limited income among alternative consumer goods and services. Regional economists emphasize location of economic activity and regional variations in economic growth.

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[1] Italicized numbers in parentheses refer to items in References at the end of this article.

In recognizing that something needs to be done, whether the problem is in economics or in another area, one's view reflects the needs of an individual or a group; a situation is seen not to be what it ought to be. The divergence of "what is" from "what ought to be" may be seen in terms of factual evidence, logical consistency, values of what is best, or emotional needs. It is frequently said that if one can state a problem clearly, the solution will not be far away. To the extent that this is so, members of Congress can prescribe useful legislation to cope with social problems and members of cabinets can implement meaningful programs, even though neither group has carefully described the situation or explained it. Similarly, managers can make meaningful decisions and issue orders without first developing a research project. And interested citizens can state problems and point toward their resolution in, for example, letters to the editor.

Sighting the problem is the first step toward a solution, and a researcher's subjective feeling for the importance of the problem is no doubt a part of that step. A prescription of what needs to be done is the end for the sake of which economics research is initiated. Thus, the economics researcher must spend much time thinking about problems such as those cited above. And the researcher who is interested in a problem is likely to do a better job of solving it.

One who grapples with economics problems by simply sighting them and jumping to the rescue may be successful. But if other steps of the research process are left out, there is a strong likelihood of failure. Immediate solutions may create additional problems. The full research process examines problems in the light of data and theory. The process can lead to improved descriptions of the problems and to greater understanding. It increases the likelihood that workable prescriptions will be found.

DATA

One can sense an economic problem without using data to describe it. Before present-day economic data systems existed, economists did not have many quantitative records showing the state of the economy. Instead, there were mostly subjective, qualitative impressions of businessmen, consumers, and financial reporters. These impressions aided decisionmaking by indicating that business was good or bad, or that prices were rising or falling. Some economists, both in earlier centuries and now, choose to spurn available data. For example, Adam Smith explained the wealth of nations and prescribed for its increase without using the population and income data available to him to describe that wealth. He said, "I have no great faith in political arithmetic" (*18*, p. 501).

Even so, gathering data is an important step in researching social problems. During the second half of the 17th century, Sir William Petty (*13*) was interested in to what extent revenues might be raised through taxation, and Gregory King (*10*) was concerned with England's capacity to wage war. These political arithmeticians developed series on income and on national expenses as a step toward solving problems. The economic tables prepared by the 18th century Physiocrats in France were early efforts at a national system of accounts. Early in this century, two groups developed a number of important economic data series which were not tied to economic theory. One was the Harvard University Committee on Economic Research; the other, the National Bureau of Economic Research.

After Keynes introduced what has since been called macroeconomics, theoretical considerations influenced much of the data collection (*9*). Today, in the United States, the core of the data base used in national economic analysis includes the national income and product accounts, interindustry flows of input and output, flows of funds, and the wealth accounts.

Theory, discussed later, affects the kinds of data collected and the way they are used. But data without theory can help to illuminate a problem and increase the likelihood of finding a workable prescription. Economics has never been a purely speculative science, regardless of what has been said on the subject from time to time. An important proportion of the energies of the discipline has always been focused on gathering facts and on tracing the history of economic activity.

Awareness of a problem stimulates the data collecting activity, but it is not a one-way street. Data collection can also affect our perception of a problem. For example, suppose we believe that unemployment is greater than it ought to be. Before we can collect data, there are many decisions to make and many intermediate problems to solve. Simply defining what is meant by the terms labor force, employment, and unemployment—a necessary step prior to data collection—can influence the way the problem is stated and understood, even before any data are collected. The term "full employment" does not mean the same thing to persons familiar with current unemployment statistics based on a household survey, as it does to economists who define the term using classical concepts drawn from competitive equilibrium theory. And a definition of unemployment based on household data is not the same as one based on establishment data. The light cast by the data on subsets of the problem—such as variations in the unemployment rate by industry, occupation, race, gender, and region—provides further feedback which is likely to modify the statement of the overall social problem of unemployment.

Even though resolution of social problems is the ultimate end for the sake of which the data are collected, what must be done first to provide the data is interesting, important, and difficult enough to become intermediate ends which warrant specialization, providing full-time employment for census takers, statisticians, and others. Collecting and distributing economic data can be an absorbing career. Examination of collected data can surface problems that might otherwise have gone undetected; sometimes the data point directly to a solution. However, data collection can become specialized and institutionalized and, consequently, unresponsive to changing problems and changing data needs.

DESCRIPTION

In the descriptive process, people arrange the available data to tell a story and to illuminate a problem. Data have a way of mindlessly piling on top of one another. The person who understands the ultimate social problem must sift through, classify, aggregate, and rearrange the data and reduce large volumes of miscellaneous facts to manageable information. This interaction between unorganized data and social problems results in meaningful descriptions. It carries us beyond vaguely felt needs toward precise conceptualizations of a problem and provides for measures of its nature and extent.

The descriptive process may require modification of concepts that influence our statement of the problem or our collection of the data. It may lead, to continue with the example used earlier, to a redefinition of the concept of "unemployment." It relates our image of the world to our measures of reality, bringing increased accuracy in both the image and the data (*3*).

Many problems can be examined using the ingredients of research discussed so far: problem statements, data, and description. Other ingredients of the complete research process—theory, explanation, and prescription—can be, or at least can appear to be, absent in the solution of certain kinds of problems. They may appear to be absent, for example, when a decisionmaker informally interprets and analyzes data. And they are, for all practical purposes, absent when the result would be the same were the theory, explanation, or prescription different.

As an example, consider that over 3,000 years ago the Babylonians collected data, described change in the heavens, accurately predicted the apparent motion of the stars and planets, and knew when to expect an eclipse (*19*). They described association of the moon with the tides. Their "explanations" of celestial motion were mythical. These were not relied on in descriptions and forecasts; thus, the explanatory myths could have been changed without altering the forecasts. Actions based on such explanations would not be likely to change the actual course of events.

Early scientific theories, such as that of Ptolemy, also explained celestial motion. These theories were a significant change from the Babylonian myths because they provided a nonmythical, scientific explanation of appearances (*21*). In such theories, the sun was assumed to orbit around the earth. Today we consider these early theories "incorrect." However, they did not interfere with the accuracy of the early celestial descriptions and forecasts.

Now we have the "correct" theory, which explains celestial motion, and, as a bonus, also explains the tides. Such a theoretical advance will be shown later to be an important step in the total research process. However, the advance was not necessary for the solution of certain types of problems. In dealing with many problems today, we use the same descriptive methods that the Babylonians used. As an example, consider shipping problems associated with the rise and fall of the tides. The tide tables appearing in our daily newspapers are still based on empirical, descriptive methods, sans theory. These forecasts are relied upon by ships' captains, fishermen, and others in planning arrival and departure schedules, for instance.

In economics, descriptions and forecasts of population, income, and employment, using Babylonian methods, are helpful to persons who deal with national growth, inflation, and unemployment. This helps to explain why policymakers have accomplished much of value by basing their actions on descriptions and descriptive forecasts, without access to theoretical explanations and analyses (or sometimes by making use of theories which economists consider "incorrect").

The important descriptive step in the research process can become a full-time career. It is true that one person can (and often does) sense and state problems, collect data, and describe the situation; however, these can be three separate occupations. A politician specializes and ensures elections by astutely identifying and stating problems affecting constituents. The politician may depend upon another specialist to gather data. Statistical agencies provide full-time employment to statisticians. A third specialty can evolve in which one descriptively links appropriate data to relevant problems. A person who finds a full-time career in descriptive work may be a consultant who translates problem statements into demands for data, transforms data into telling descriptions, and aids interaction resulting in reconceptualization of the problem and refinements of the data.

Stating problems, collecting data, and developing meaningful descriptions are useful in dealing with economic problems. But these three steps do not constitute what we call economic science; they do not comprise the full process of economic research. Going back to the celestial example, the Babylonian descriptive methods solve certain kinds of problems, such as when to launch an ocean-going vessel, but not others, such as how to probe Mars. The descriptive process helps us anticipate a result, but it does not provide an explanation which allows us to intervene and influence the result. That is the role of theory.

THEORY

The Babylonians apparently made no effort to understand celestial motion beyond a belief that the gods moved things as they saw fit. The idea of finding natural explanations of events is attributed to the Greeks (*21*) and led to the Ptolemaic geocentric theory. Babylonian, Ptolemaic, and modern ideas about celestial motion are equivalent for descriptive purposes, but not until the Copernican heliocentric theory was developed could we intervene, say, with a space probe to Mars.

Theory allows us to make natural explanations of economic phenomena. When economic theories have been "incorrect," they have been of little more use than the myths they replaced. But to the extent that they have been "correct," they have provided understanding of why social problems developed, and they have pointed to remedies.

If economists expect to understand and influence the course of events, they first need theory. Adam Smith wove many threads of economic thought into a theoretical pattern (*16*) and, as a result, he became known as the father of economics. Once the logical relationships among economic ideas were established in theory, it was possible to imagine future events which were more than extrapolations of descriptive history. Alternative futures could be examined and a choice could be made. Smith prescribed policies which would alter the course of events and lead toward a desired outcome because, for example, he could predict alternative levels of national wealth that would result if more people were to enter the labor force, or to specialize through division of labor. Today, macroeconomic theory explains unemployment in a way which can guide a government in monetary and fiscal policies. Microeconomic theory explains profit-maximizing principles which can guide a manager in allocation of scarce resources.

Economic theory represents for a social science researcher what a good novel can represent for the alert reader. Economic theory and the novel abstract from reality to set up ideal types, give them rules for behavior, and play them out in imagination. Each helps us understand social problems. Each has intrinsic value providing interest and, perhaps, entertainment for the creator and the user. And each suggests alternative modes of behavior which might be used to change society.

Theories can be simple, such as the ones based on principles of comparison and classification which underpinned farm management analyses during the early decades of this century. A body of economic theory can also be complex, requiring years of study before it is mastered, such as the neoclassical microeconomic theory now used in farm management analysis.

Economic theory as abstraction—a system of logical rather than factual relations—forms a model. We want theoretical models to be as close to reality as possible, and we like to think that when they are not, we revise them. Of course, it does not always work that way. For one thing, we do not always know what "reality" is. For another, theories are blatantly at odds with reality when they incorporate assumptions that preference patterns are fixed, markets are perfectly competitive, government spending is autonomous, and resources are mobile among regions. But we do not always modify such theories or scrap them. We tend to keep using them as long as they appear to satisfy our needs for explanation better than available alternative theories.

Pure theory—that is, theory applied to a problem without recourse to data—has proven useful (*7*). From pure theory and a few reasonable assumptions about reality, we can deduce, for example, that beef consumption will increase as a consequence of an increase in pork prices, other things being equal. From theory without data, we can compare the merits of a food stamp program with those of income supplements as alternative means of reaching social welfare objectives.

Pure theory can be used to explain how a system works, predict directions of change, and point to policy instruments that will induce society to move in a desired direction. It will not, however, estimate magnitudes of change or indicate the qualitative importance of alternative policies. It can suggest that a given relationship is theoretically valid, but pure theory cannot tell us whether it is empirically important.

Economic theory is a sufficiently complex and interesting subset of economics to attract persons to devote their careers to mastering existing theory, modifying it, and disseminating it. It can be treated as an end in itself and provide a useful and interesting area of specialization. Economists who make a lifetime career out of economic theory may become teachers and authors of textbooks. At the same time, it is just one ingredient in the total research process. "Theory," said Storey, "must be judged on the basis of its usefulness in solving relevant problems" (*18*).

EXPLANATION

Through the interaction between data describing what is, and theory relating one fact to another, our explanation of a social problem arises. As we have seen, one can sense a problem of unemployment, and data can illuminate the intensity and scope of the problem and serve as a basis for forecasting. Theory can illuminate the problem in a different way by suggesting possible causes of unemployment, such as insufficient aggregate demand, an energy shortage, or regional bottlenecks in the flow of materials.

Data and theory also illuminate one another. Their interplay helps to make clear that which is to be understood; reasons are found; validations are made. Theoretically possible causes can be evaluated with respect to the current situation. This may lead to an empirically valid explanation and may point to appropriate intervention.

When the hypotheses or deductions from theory are not accepted, reformulations of the theory may be needed. Theory is also an important source of ideas for suggesting needed data revisions (*2*). In most research, we tend to accept both the theory and the data. The explanatory step merges them so that empirically useful policy prescriptions can be found.

Merging data and theory is possibly one of the more fascinating areas of specialization in economics research. While simple methods frequently serve for satisfactory classification and explanation, extremely complex methods can also be used. Intriguing problems arise when acquiring and operating computer hardware, devising and operating software packages, and developing models and data sets. Analysts find sufficient challenge to make full-time careers out of improving and refining methods of simulation, linear programming, regression, and other empirical research techniques.

This explanatory area of specialization attracts econometricians, model builders, computer specialists, and others who are interested in solving numerous interesting puzzles. Concern is sometimes expressed that too much time will be spent at this task at the expense of other parts of the research process, leading to rigorous but irrelevant research. However, it is sometimes said that this potential for rigor is a strength which distinguishes economics from the other social sciences (*6*).

PRESCRIPTION

Policy prescription is the end for the sake of which the research process was initiated. Research-based prescriptions presuppose descriptions and explanations. Policy prescriptions provide alternatives for action. National policymakers may be advised to deal with the unemployment problem with, say, a tax cut of $X billion coupled with an expansion in the money supply of $Z billion. Or, dairy farmers may be advised to plant small grain fields with pasture grasses, expand the dairy herd, and purchase feed grain rather than grow it. Prescription is the most important phase of the research process in the sense that, through actions based on prescriptions, social problems are solved.

Yet, many researchers spend little or none of their time advocating policy. One reason, evident from the above discussion, is that many other things need to be done first—each of which can become totally absorbing. It is easy (and useful) to become engrossed in identifying problems, or collecting data, or preparing descriptions, or developing theory, or seeking explanations. Each of these activities provides challenge, has its own interesting puzzles and problems to solve, and is rewarding. Those who specialize in these tasks may find little or no time or inclination to advocate solutions to the ultimate social problems from which these activities are derived.

Many research economists shy away from the precarious role of political advisor. When a research economist arrives at a policy prescription, it is based on an understanding of the problem, the data, and the theory. Much careful description and explanation presumably lies behind the conclusion. However, when a research economist becomes identified with a certain prescription, followers may be attracted for ideological reasons rather than for the compelling conclusions of the research process. By the same token, opposition may develop for ideological reasons.

For example, based on research findings, a researcher may advocate acreage controls and price supports as the solution to the farm income problem. Some of those who support this conclusion may do so not because they understand the research methods, but because they are attuned ideologically to government intervention and regulation as an expedient. Some of those opposed may be attuned ideologically to free market forces and the principle "that government is best which governs least." Both followers and opponents may want to solve the social problem, yet neither may understand the

In Earlier Issues

Many of the important economic problems of farmers are associated with unstable incomes. A farmer who has a fluctuating income will pay a higher total income tax than one who has a relatively stable income. Individuals should be permitted to average their incomes over a period of years for tax purposes.

Daniel W. Burch
Vol. III, No. 1, Jan. 1951, p. 18

economist's analytical bases for the prescription. Alinement with one of two or more conflicting ideologies can place the researcher in the midst of a political battle which could have been avoided had no explicit prescriptions been made.

Of course, there are other reasons for research economists to enter the policy arena cautiously. They may be wrong. They could base the prescription on faulty descriptions or explanations. Or, the prescription may overlook views held by persons other than economists, and the policy may need to be modified to accommodate other social values or political requirements.

Economists have developed a hedge against the vulnerability associated with entry into the policy arena. For example, Robbins advocated that economists simply state the possible alternatives for economic policy and their consequences without advocating one in preference to another (*14*). Thus, the burden of choice is transferred to the policymakers. Not all economists follow Robbins' advice and even he reversed his position two decades later (*15*). Sometimes an entire research organization is dismantled because of its prescriptive activities (*20*). Some economists willingly take a stand on an issue and openly implore their colleagues to do the same (*5*).

The apparent dichotomy between those research economists who risk advocating prescriptions and those who do not has become so strong that a distinction is sometimes made between policy research and other kinds of research. Farrell, noting the declining emphasis on policy research in agricultural economics during the last one or two decades, expresses concern that many recent analyses do not focus on major policy issues (*4*).

Based on the framework for economics research described here, it is difficult to understand what would constitute nonpolicy research, as research is undertaken ultimately to deal with a social problem. At the same time, the framework does explain how this objective can become sidetracked for both positive and negative reasons: the other five steps in the research process can fully and usefully absorb available talent.

Although many obstacles hinder engaging in policy advocacy based on research, some persons make a full-time career of extending research results to final users and specialize in advisory or consulting services. The agricultural extension service was built on the idea of disseminating the results of research in agricultural colleges to farmers; the Congressional Research Staff in the Library of Congress digests existing research reports and puts them in a form useful for legislative action.

Many researchers make a particular effort to follow through to the policy implications of their research, and leaders in the profession urge increased emphasis on this important activity (*4, 6*). Those who accept this challenge frequently find their jobs more interesting, perhaps more lucrative, and occasionally more famous or infamous.

RESEARCH CONFIGURATIONS DETERMINE THE BRANCHES OF ECONOMICS

One of the tasks of economic science is to formalize and institutionalize the decisionmaking process. Politicians fought inflation and businessmen sought profits long before the field of economics was developed. Those politicians and businessmen grappled with some of the same problems then as they do now that economics is a relatively mature science. However, in a mature science, the research configuration contains several parts, each important enough to be a specialty, but all of which function together (*11*). The parts can be used to discriminate among different research configurations.

So far, we have been talking about economics as if it were monolithic. Actually, it has many branches, each using its own data base and theoretical models to work on its own set of problems. Two important, highly developed examples already mentioned are: (1) Macroeconomics, which uses Keynesian and neo-Keynesian economic theory and data such as the National Income and Product Accounts, to deal with problems of inflation and unemployment; and (2) microeconomics, which uses classical and neoclassical economic theory, and market price and quantity data, to deal with problems of allocation of scarce resources. The descriptions, explanations, and prescriptions familiar to a macroeconomist can look strange to a microeconomist. Each of these two examples, and each of the many other subsets of economics, has its own research configuration; some more highly developed than others. The kinds of theories a researcher tends to understand and the kinds of data sources he tends to turn to, depend on the kinds of social problems he is interested in. Hildreth observed that mutual interests among apparently diverse professionals in one or more parts of the research process are the "tie that binds" them into a common organization (*8*).

The potential for economics research is that the research process provides a systematic way for society to deal with social problems. Researchers seek to describe and explain certain social problems and to prescribe remedies based on available data and theory. The collective output of individual researchers and of research teams provides society with a better basis for dealing with certain of its social problems than if one or more of the steps were deleted. Variations in the way these steps are followed by different researchers can identify schools of economics and types of researchers. If one or more of the parts fails to form, the science is not mature. When the science is mature, the research process, whether followed by individuals or teams, includes standard, efficient ways to look at problems, data, and theory, and to provide descriptions, explanations, and policy prescriptions.

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In Earlier Issues Southern farmers have seldom been lazy but they have experienced low per capita production and income compared with farmers in other major agricultural regions. The South has a long history of methods which use a great deal of labor in relation to other factors of production. Historically the major reasons for this intensive use of labor and for the lag in farm mechanization have been the large available supplies of unskilled labor and the fact that machines to meet the peak labor needs of the South's major cash crops had not been perfected. . . . One of the best-bet approaches to lowered production costs, and thus a chance to meet the competition, is the introduction of new methods and new machines in cotton production.

Grady B. Crowe
Vol. III, No. 1, Jan. 1951, p. 1

INTERNAL MIGRATION: A COMPARATIVE PERSPECTIVE

Brown, Alan A., and Neuberger, Egon, editors. Academic Press, New York, 1977, 508 pages. $29.50.

*Reviewed by Calvin L. Beale**

Perhaps it is easiest to justify a review of a collection of papers on migration in an agricultural economics journal by quoting one of the authors, Joseph Berliner: "Most people who write about migration are not interested in migration at all." Rather, he notes, they are concerned about its consequences. If so (and it seems a fair statement), agricultural economists should certainly be interested, as the largest streams of peacetime migration have been associated with the interplay of agricultural and urban development.

This book is one of a series sponsored by the Committee on Comparative Urban Economics. Because migration is relevant to different disciplines, research on it tends to exist in separate bodies of literature. In this case, authors from the disciplines of demography, economics, sociology, and anthropology have been brought together. Some of the chapters are reviews of existing literature, some are highly conceptual or methodological, while others are case studies, mostly of American and European trends.

Joseph Spengler and George Myers contribute an excellent overview of "Migration and Socioeconomic Development," with an exceptional bibliography. In a part of the book given to methodology and measurement, Owen Hall and Joseph Licari present a model for forecasting regional migration flows in what they term, "a regional general equilibrium context." In a novel approach to projections for the Los Angeles area, they posit a strong linkage with air pollution conditions and develop an equation to use projected change in these conditions as a major determinant of migration. This approach has the capacity to signal a turning point in the net direction of migration, which is often the most difficult aspect of migration projection.

The portions of the book of most probable interest to agricultural economists are those on rural-to-urban movement and the effects of different national economic development approaches on such movement. Kingsley Davis has written a useful chapter on international comparisons of the effect of outmigration, particularly rural, on regions of origin. Davis notes that, in today's underdeveloped countries, rural population loss is occurring from agricultural adjustment at a later stage in development—and probably at a slower initial pace—than was true in nations where industrialization occurred earlier. This results not from lack of outmovement, but from higher birth rates and lower death rates than characterized nations now industrialized. Countries also seem to reach a higher degree of urbanization today before rural population decline sets in.

Davis cautions against an unreasoning fear of the consequences of population decline in rural regions. He demonstrates from the American case that States with heavy loss of agricultural population in recent decades have had greater advances in income and education than other States. One of his conclusions stands in direct contradiction to one drawn by Peter Morrison in his chapter: "Functions and Dynamics of the Migration Process." Morrison contends that prolonged outmigration ". . . leaves behind those persons who are least able to cope with the unfavorable conditions that led others to depart in the first place," and that such areas become attractive only to marginal industries because of "overaged, undereducated and underskilled" workers. But Davis notes that, in the United States, ". . . population-loss States sent out more farmers and more blacks than they sent people in general. Since neither class was high in the economic scale, this fact suggests that it is people of lesser material circumstance who leave in greater abundance. If so, the labor force tends to be upgraded by outmigration."

This reviewer tends to agree with Davis. Although Morrison's is the classic contention in migration theory, agricultural displacement has disproportionately consisted of tenants, hired workers, and marginal farmers. These groups have been below average in social-economic status and have lacked control of their own future. Group members may have succeeded comparatively well in the cities, but their departure has hardly crippled the rural areas, although it has caused some economic and social disruptions as any substantial population loss would. The surge of rural employment growth in the last decade does not suggest that employers view areas negatively simply because of a history of outmovement.

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Brown and Neuberger's book is notable for several excellent studies of migration in the socialist countries of Eastern Europe. In Poland and Yugoslavia, commuting of rural residents to urban employment is shown to have been a common means of accomplishing industrialization while minimizing rural-to-urban migration and urban investment. Such migration has occurred, but it would have been much larger had not an extensive pattern of daily commuting developed. The workers involved are often part-time farmers also. From political and economic circumstances quite different from the American situation, a pattern emerges of part-time farming and reliance on nonfarm income that is similar to conditions in the United States.

In a thoughtful chapter, "Internal Migration: Measurement and Models," Julius Margolis concludes: "The thrust of research on migration has been on the determinants of the flows, not the consequences for the receiving or sending communities, and therefore it has not been as useful as possible for policy formulation." This point seems especially pertinent to the status of research on today's trend of urban-to-rural migration in the United States (only passingly referred to in the book).

Margolis also notes that the most sophisticated migration models derive from sociology rather than from the economic tradition. He suggests that economic models simply do not tell enough about the characteristics of migrants, although their information may be very important for policymakers. He further contends that the ". . . proliferation of aggregative multiple regression analyses . . . has had more the character of intelligent treatment of data than the testing of theoretically derived hypotheses."

Internal Migration: A Comparative Perspective is a step forward in migration literature. It has more of the virtues possible with multi-authored collections than the defects of coverage gaps, overlaps, or stylistic jolts frequently inherent in such works. ■

ECONOMIC AND FISCAL IMPACTS OF COAL DEVELOPMENT: NORTHERN GREAT PLAINS

John V. Krutilla and Anthony Fisher with Richard E. Rice. The Johns Hopkins Press, Baltimore, Md., 1978.

*Reviewed by Lloyd D. Bender**

The authors of this monograph set out to evaluate the local economic and fiscal impacts of coal mining and conversion activities on governments in Rosebud and Big Horn Counties, Montana. These two extremely rural counties are in the center of an area containing much of the Nation's low-sulfur coal reserves. Low-sulfur coal output will increase to supply additional demands and to substitute for oil and natural gas used in electricity production. An increase in U.S. annual coal production of 350 to 400 million tons by 1985—two-thirds of current production—is envisioned and much of it could come from three Northern Great Plains States. Such development ". . . imposed on a largely rural environment . . . is believed inevitably to bring in its wake profound changes in the region's way of life." The authors address issues termed ". . . doubly critical because local sentiment is not universally favorable toward large-scale coal development . . .". They hypothesize, and current events confirm, that the siting, water allocation, environmental, and health regulating authority invested in the State will " . . . greatly influence the scale, character and rapidity of energy development in this pivotal State."

Three aspects of the study will appeal to different readers: the description of tax codes, the modeling methodology, and the conclusions concerning impacts.

The tax system is changing rapidly in each State undergoing substantial new coal development. Montana is no exception and some laws already differ from those described in this report (*6*, p. 29).[1] Half the State severance tax proceeds are to be placed in trust after 1980. Formulas did allocate 1.5 percent of severance tax proceeds directly to coal producing counties and 9.75 percent for coal highway development programs, but in 1980, no monies are designated for those purposes. Grants by the Coal Board to the local governments affected are limited to 9.1 percent of severance tax proceeds after 1980. Furthermore, not only is the current coal impact aid system under serious study within the State, but also the Montana severance tax itself is being challenged in court by utility companies.

Socioeconomic data underlying the analysis in the monograph are generated by an adaptation of the Harris model which contains 99 industry sectors, 4 extra (governmental) labor sectors, 69 investment sectors, 28 types of construction, 4 population age groups, and 2 races (*2*). The recursive model is driven by exogenously determined levels of coal mining and conversion activities. Coefficients are estimated by applying ordinary least squares regression to lagged independent variables from 1965-66 data for 3,111 U.S. counties. The application to rural Montana of coefficients estimated from observations which are obviously dominated by urbanized counties assumes that ". . . underlying structural relations are . . . the same across counties—profit seeking firms will respond in much the same way to changing opportunities in Montana as in Missouri—but the counties need not have the same mix of activities at any particular moment." This point is addressed differently in (*1*, p. 31).

Key estimating equations are for annual changes in output, employment and income by sector, and net migration. Net migration is the major source of labor, and wages are an incentive attracting people to rapidly growing rural areas.

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*The reviewer is an economist with the Economic Development Division, ESCS, stationed at Montana State University.

[1] Italicized numbers in parentheses refer to items in the Bibliography at the end of this review.

The problems associated with the estimation and the type of empirical choices made by the analysts are illustrated by the results of the employment change equations. Different explanatory variables are significant in different industry sectors. In general, the signs associated with the estimated coefficients which were significant are rational; for instance, coefficients on transportation costs are significant and negative in 12 output and 28 of the input sectors. A negative relationship with wage rates and land prices exists in 6 and 15 sectors, respectively. The coefficient for lagged output in the employment change equation is positive for 26 sectors, and negative for 29 sectors. The authors interpret positive signs as the effect of external economies and agglomeration, and the negative signs as signifying the effect of depreciating equipment on output.

Estimated expenditures are compared to revenues which are a function of an estimated tax rate applied to taxable value of property. Tax rates are estimated as a function of income, population density, taxable property, and land area. Expenditures for towns and counties are estimated from linear equations fitted to 1972 *Census of Governments* data. School expenditures per pupil are the sum of the annual operating expenses in Montana for 1974-75 of $1,014 plus an engineering estimate of the annual debt service cost of new facilities. The differences between revenues and expenditures are carefully qualified as representing only outer boundaries.

The conclusions about local fiscal impacts will tend to hold true regardless of empirical approach—". . . the sources of revenue from the complex of taxes provided, and the available transfer mechanisms . . . could provide funds to supply . . . public services . . ." associated with local governmental jurisdictions. The most critical problem is cited as the element of risk (the timing and location of mine openings and closings), which is independent of the adequacy of tax yields.

Counties can rely upon the tax base provided by the gross proceeds of the mine. School districts have the State and local school equalization program to support expenditures for operations regardless of tax base. School enrichment programs and additions to capital facilities are strictly district responsibilities. School districts which are affected but do not have the tax base of new mines will experience financial impacts. Towns will receive most of the new population but will not have the new tax base of mines or thermal generators. The severity of impacts on towns will depend on how many State and Federal categorical grants they receive.

The conclusions in the book should be qualified in two important ways—applicability to other States and the narrow scope of impacts addressed. The basic features of the Montana tax system so dominate the situation that even differing methodologies bring similar conclusions (*5*). But one cannot generalize to other States (*3*, p. 66; *4*).

The main feature of the North Dakota tax system is the distribution of State receipts to local governments from the coal severance and electricity production taxes (*7*). The disbursement is by formula; thus, school districts and towns not affected by coal development receive aid if they are within the county where development is occurring. The property of coal mines and thermal generators create very little local tax revenue in North Dakota.

Wyoming is at the other extreme. The incidence of local property taxes falls more on a mine or thermal generator than in either of the other two States. However, the Montana case will prove interesting in historical perspective because of the severance tax, the construction of new towns, ownership of resources by American Indians, and the spillover of impacts into Wyoming.

A final caveat is that all impacts should be addressed. Local impact costs are dwarfed by other, sometimes subtle, costs of coal development and utilization throughout the region. Consider the loss of aquifers, the spillovers of population and related service activities into other parts of the State, or the uncertainties associated with exhaustable resource exploitation. Many of the costs of the impacts will be borne by future generations. We need, in short, an expanded profile of a society in a region which eventually will be producing as much coal as Appalachia now does.

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INTRODUCTION TO STATISTICAL TIME SERIES

By Wayne A. Fuller. Wiley-Interscience, 1976, 470 pages. $24.95.

*Reviewed by Dwight M. Gadsby**

Dr. Fuller states in his book that ". . . the analysis of time is one of the oldest activities of scientific man" (p. 1). In a time when everybody wants to be considered "first," a way to be included in the running is to be considered one of the first or one of the "oldest". Man the scientific evolutionary survivor, man the scientific hunter, man the scientific domesticator of plants and animals,[1] man the scientific swapper of colored stones and the ensuing complex systems of exchange, plus possibly some other roles, likely preceded man the scientific time series analyst. Nonetheless, Dr. Fuller's loyalty to his subject is commendable.

Kendall and Buckland define time series as:

> A time series is a set of ordered observations on a quantitative characteristic of an individual or collective phenomenon taken at different points in time. Although it is not essential, it is common for these points to be equidistant in time. The essential quality of the series is the order of the observations according to the time-variable, as distinct from those which are not ordered at all (e.g. in a random sample chosen simultaneously) or are ordered according to their internal properties (e.g. a set arranged in order of magnitude).[2]

Professor Fuller has written his textbook within the context of this definition. Unlike many of his contemporaries, he has not mixed rambling and only tangentially related scientific data to illustrate his book. He is brief, relevant, and concise, using simple time series items and well-ordered theorems to present his message.

Do not be deceived, however, by the title of this book. The context usually implied by "introductory" relates to a level of comprehension and background which could be mastered by undergraduates and casual empiricists. This is not the case with Fuller's book, which clearly is not for beginners. Nonetheless, it will be extremely useful as a research and learning tool to students of statistics and economists with good mathematical and statistical backgrounds.

The sequence in the book is excellent. Several chapters provide specific references at their conclusion for the dedicated to explore further once the basic concepts are mastered. With the organization of his text, Professor Fuller has sucessfully presented practical statistical techniques and the relevant theory which underlies them. The topic titles are: (1) Moving Average and Autoregressive Processes, (2) Spectral Theory and Estimation (3) Large Sample Theory, (4) Estimation of the Mean and Autocorrelations, (5) The Periodogram and (6) Regression for Time Series.

The introductory chapter sets the tone for the entire work. Chapters 2 through 5 contribute to mathematical foundations and chapters 6 through 9 constitute an examination of the elements of time series analysis. I see only one flaw in the organization. This book is a teaching text and the exercises seem to be added to promote learning skills. If so, answers for at least some of the exercises would be useful. Knowing Professor Fuller's ingenious facility for developing examination questions, I doubt seriously if he is saving these exercises for mid-term or final exam questions.

One of the great merits of this book is the "plastic" nature of its array of statistical and data examples. The examples used are not taken strictly from agriculture or the bio-sciences, but range from agricul-

In Earlier Issues

There is a much greater chance that families with moderate or high incomes will achieve adequate diets than families with low incomes. At the same time, these studies have shown that many moderate and high-income families do not have nutritionally adequate diets. Therefore, it is apparent that a major educational effort as well as high levels of employment and income would be essential to the attainment by all families of even the minimum level of consumption.

Marguerite C. Burk
Vol. III, No. 1, Jan. 1951, p. 15-16

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[1] Bronowski, J. *The Ascent of Man*, Little, Brown & Company, 1973, p. 59.

[2] Kendall, Maurice G., and William R. Buckland. *A Dictionary of Statistical Terms*, Hafner Publishing Company, New York, 1960, p. 294.

ture to the general economy. Some current statistical tracts quote data almost exclusively from one particular field, perhaps implying that time series analysis may be an exclusive domain of one field or another. Every new presentation of data in a new book such as this, however, may provide surprises for certain readers. The British Chapter of the Women's Christian Temperance Union may be shocked to learn (if they didn't know it already) that the annual consumption of spirits in the United Kingdom from 1870 to 1938 may have been positively correlated with real income.

Individual chapters of this book are particularly unique and interesting. Several would be useful if presented on their own. Chapter 7, "The Periodogram, Estimated Spectrum," shows Fuller's mastery of this subject as well as his familiarity with the "old masters," especially Professors Tintner and H. O. Hartley.

Chapter 5, on the other hand, is uniquely Professor Fuller. His knowledge and skill in the explanation of the Central Limit Theorem is outstanding. Professor Fuller and his students continue to excel in their contributions to this topic. The last chapter of the book, however, appears to be the most applicable of all. A feature of this chapter which distinguishes this book from competitors is the lucid explanation and development of the least squares and lagged variable techniques for use in time series analysis. This final chapter should be most helpful to agricultural economists who seek new guidance in the design of experiments and the use of regression in time series analysis.

Professor James T. McClave has noted that this book is a "well-produced" first edition: "Professor Fuller has made an important contribution to the time series literature by providing a book which is appropriate for teaching time series."[3] Professor Fuller has also been recently complimented on this work by the great Professor Gerhard Tintner who was once his teacher. Nothing can be added to a Tintner commendation. ■

THE ECONOMIC GROWTH DEBATE

E. J. Mishan. George Allen & Unwin, Ltd., London, 277 pages. 1977. Cloth, $18.75; Paper, $8.75.

Some books are more controversial than others. Mishan's newest contribution to the economic growth debate has itself become the subject of debate among some USDA economists. Below are two views of his book: one reviewer summarizes some reasons why you should read the book; the other warns you to be on the defensive should you read it. [ed.]

Yes, read it . . .

Modern technology is awesome in its ecological and social impacts. Hence, the pursuit of economic growth through the application of modern technology may do more harm than good. In addition, economic growth in the affluent countries is using up nonrenewable resources at an alarming rate which threatens to impoverish future generations. Finally, "man does not live by bread alone." Social well-being is multidimensional; it does not bear a one-to-one relationship to material prosperity.

Therefore, to attain the good life, we should move directly to improve important social conditions rather than to expect that social progress will be a natural byproduct of economic growth. These are E. J. Mishan's major themes in *The Economic Growth Debate*, laid out succinctly in the first three chapters and developed more fully in the rest of the book.

In chapters 8 through 18, Mishan outlines and attempts to refute arguments advanced by the proponents of economic growth, arguments he characterizes as the "nonagenda" of the economic growth debate. Selected chapter headings suggest his themes: "The Doomsday Syndrome," "The Manifest Desire for More Economic Growth," "No Alternative to Economic Growth," "Science as Man's Servant," and "Antigrowth as an Elitist Fad."

In chapters 19 through 24, the author focuses on whether long-term economic growth is either possible or desirable, concluding that it cannot be sustained. He believes additional growth is not desirable because, in an affluent society, "an individual's satisfaction comes to depend less on his absolute income and more on his income relative to the incomes of others." Any increase in material well-being, he states, will be accompanied by a more than offsetting deterioration in the ecological and social environment.

In chapters 25 through 38, Mishan examines the constituents of the good life. Emphasizing the nonmaterial aspects of social well-being, he looks at such dimensions as health, leisure, enjoyment, security, love and trust, self-esteem, and personal freedom.

The effect of modern technology on society receives analysis in chapters 39-48. Mishan cites examples of actual and potential damage to the ecological system and dangers to society from the introduction of new drugs and pesticides and from the use of nuclear energy. He also postulates that modern technology has aided and abetted the arms race and has fostered large-scale social organizations—big business, big labor, and big government—and a society of highly specialized, interdependent activities and individuals. Such a society is extremely vulnerable to disruption by acts of God, well-organized groups, or a knowledgeable individual (one who knows how to make atom bombs, for instance). To counter this threat, society must attempt to protect itself by limiting personal freedom.

Clearly disturbed by what he sees, Mishan would like to turn back the clock by rejecting modern technology and returning to a simpler, more idyllic era. This, of course, is impossible. Mishan's contribution lies not in his proposed solution to the problem, but in his review of some lessons we should have learned by now, concerning: (1) The dangers and harm that accompany the unquestioning pursuit of economic growth and the indiscriminant application of new technology; (2) the need to re-examine our use of nonrenewable resources; and (3) the need to consider directly improving nonmaterial conditions of life rather than to assume that improvement will automatically come with economic growth.

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[3] McClave, James T. *Technometrics*. Vol. 20, No. 2, May 1978, p. 833.

Herman Bluestone
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But beware . . .

". . . mankind has a long past and an uncertain future."—Abba Eban (delegate to the United Nations Conference on the Human Environment, June, 1972).

E. J. Mishan is professor of Political Economy at the London School of Economics and enjoys an international reputation as an economist and environmentalist. He has written extensively on both economic theory and environmental issues. *The Economic Growth Debate* represents an addition to the rapidly growing body of literature involved with environmental problems. In this book the author is concerned with the effects of economic growth on the human condition, particularly with the possible negative effects of technological change on the social environment. For over a decade, Mishan has been a leader among economists concerned with the "costs" of economic growth. This kind of interest is, however, relatively new to economists and is built on the enlightenment provided by those outside mainstream economics.

In 1962, Rachel Carson, a biologist, wrote *Silent Spring*, a book that may have changed the course of economic history. At that time, the term environment had little economic meaning and the word ecology had little public recognition. Her interest in the subject arose from the ubiquitous and pernicious practice of using toxic sprays for the purpose of pest control. The thesis of the book, after much controversy, was finally sustained by a Presidential Committee in 1963. *Silent Spring* marked the beginning of what is now called environmental economics, and in one decade changed the attitude of a nation.

While *Silent Spring* is compelling and powerfully written, *The Economic Growth Debate* is a regrettably clichéd polemic. The text is discursive and messianic in tone, texture, and content. One may wonder how a book dealing with the destructive aspects of pesticides could become a best seller, while one dealing with the quality of life could be less promising. I suppose that, although economics as a science may not be dismal, many of us economists make it seem so. We have, for example, reduced environmental problems to the realm of externalities leading to the absurd notion of "optimal" (desirable) pollution, and demonstrating to the world, again, that some of us know the price of everything and the value of nothing.

Economists generally accept as self-evident the optimistic proposition that sustained economic growth over the past 200 years has increased human well-being. As Professor Dorfman has succinctly stated, ". . . the GNP maximization criterion, with all its shortcomings, is the only one that is . . . of practical importance." A minority of economists, however (Jaurenel, Kneese, Baulding, and Scitovsky), hold that well-being is a difficult notion to quantify and, therefore, its connection to the level of economic growth is suspect. Two Yale professors, Nordhaus and Tobin, are attempting to measure the environmental costs of economic activity in order to adjust GNP, the conventionally used measure of growth, to obtain a measure of net economic well-being. Yet, none of the opponents to the conventional wisdom that "more is better" are as radical as Mishan. Largely through his efforts, the movement toward a no-growth society has acquired increasing popularity.

In *The Debate*, although Mishan separates the problems of economic growth into a multiform diversity, the one central idea to which all others are subordinated is that economic growth and technological change will combine to worsen the human condition. The book will appeal to two basic groups: those who accept its thesis and feel comforted by having their biases reaffirmed; and those who prefer to have experiences served up to them without any individual mental effort to discern for themselves the substance of the debate. Mishan conjectures that economic growth and technological change are responsible for the social ills of sin, sex, crime and general moral decline:

> . . . there is the relationship between increasing affluence in the West and the increasing permissiveness with respect to sex and pornography, and with respect to violence and vandalism. Permissiveness in films, theatre and media entertainment . . . has gone far to implant the idea of physical violence as rugged, chic, and sexy. It has acted also to encourage public tolerance of violent and antisocial behavior, and contributed to a mood that has resulted in greater leniency in the treatment of offenders.

Technological change is also alleged to be responsible for the destruction of the family. "The vocation of the housewife and mother has, thus, been made obsolete by the remorseless advance of technology. And with the collapse of her role, the institution of the family, of which she was the central pillar has begun to collapse also."

In his forward the author informs us that his method is "to assess each and every consideration by reference to its contribution to the broad theme . . . whether continued economic growth can be expected to enhance social well-being." Unfortunately, although raising a multitude of issues, he systematically evaluates none of them. Each of the book's seven parts contains a series of 2-, 3-, or 4-page chapters which, instead of providing an assessment of the impact of economic growth and technological change on the relevant issues, gives a narrow narrative of the author's own misgivings regarding such change. For example:

> It follows, that opportunities for meeting directly and personally the needs of other people, opportunities for the exchange of sentiments, opportunities for cultivating friendships that arise from the exigencies of life, are all on the wane in a technologi-

> cal civilization in which machines are being designed to provide us with everything.

At times, Mishan's language becomes suspiciously preaching in tone, and he frequently indulges in such sweeping generalizations that the reader jumps up and down in indignation.

> How much does crime depend upon the fast get-away car? How much of the increase in assault and robbery on the streets of American cities and suburbs can be attributed to the gradual disappearance of people from the streets, a result of the mass adoption of the motor car and to some extent also, television? . . . the core of the moral law has to be accepted as sacred, and beyond the will of men to alter; indeed, that any trespass into the area of religious injunction surrounding it is to be regarded as dangerous and exceptional.

The author's opinions on human behavior are neither supported, documented, nor well-reasoned. More importantly, however, he has foregone an opportunity. Beyond his simplistic admonitions of what economic growth and technological change have wrought lies the fundamental question of what a no-growth economy really means. One would not be surprised to learn that it means different things to different people. Some define no growth in terms of consumer goods; some, real output per capita; others, real capital stock. Once growth or no growth has been clarified, it would be meaningful to ask what a zero economic growth society might be like, would it improve the human condition? These are difficult questions to answer, but answers are the obligation of those who propose change. Mishan's new book does not seem to increase our knowledge of what the path would be like to move from a growth-oriented economy to a no-growth economy. Instead, he looks to the past, "to the good old days," and gives us a book filled with his own rambling interpretations of the roots of "everything bad" in modern society as being the result of technology.

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A NOTE ON SMALL FARMS

By James A. Lewis
*and Peter Emerson**

The Food and Agriculture Act of 1977 extends Federal financing of land-grant college and university small farm research and extension programs for 2 more years. A spending authorization not to exceed $20 million per year was established, and the Secretary of Agriculture is required to report annually to Congress on the programs.

We present a profile of the small farm population based on data for those farms grossing less than $20,000 annually (table).[1] Some important characteristics of the population are as follows:

- Although they represent just over 70 percent of the total number of farms, small farms are not a major factor in the production of food and fiber; they account for only 10 percent of total farm sales.
- Small-scale farmers control 31 percent of total farm assets and compared with larger scale farmers their assets are relatively unencumbered by debt. Proprietor's equity per farm averages a little more than $80,000.
- Nationally, about 4 out of 10 small farms are classified as livestock farms, 3 out of 10 are cash grain farms. However, about 85 percent of the small farms are found in the South and North Central States, where these operators are heavily concentrated in cash grain commodities, cotton, tobacco, and labor-intensive specialty crops in addition to raising livestock.
- As a group, families living on small farms earn about $15,000 per year and they derive more than 80 percent of their income from nonfarm sources. In 1974, 42 percent of all small farm operators reported working off-farm 200 days or more.
- An estimated 15-20 percent of the small farm population falls below the "poverty line." The incidence of poverty among farmers has dropped dramatically. Farm people comprised 19 percent of the poverty population in 1960 and 5 percent in 1976. However, 15 percent of the nonfarm population was estimated to be in poverty in 1976.
- On the average small-scale farmers are slightly older and less well-educated than other farmers.
- Four percent of the small farm population are members of minority groups, but over 90 percent of all minority farmers are in the small farm category. Compared with other farmers, minority operators are generally older, work fewer days off the farm, have smaller farms, and tend to be primarily engaged in crop production. Minority farm families are more likely to be heavily dependent on farm earnings as a component of their total income.

The data in the table and related literature on small farms support three general observations. First, the small farm population is extremely diverse, partly because of a broad statistical definition of a small farm as one with under $20,000 gross sales. Second, the appropriate unit of analysis is the family or individual, not the farm. The primary goal of small farm research and extension programs should be human resource development in which the family's income options—both farm and nonfarm—are considered. Third, some small farm operators and their families have no feasible nonfarm opportunities or very limited ones. In some cases, it may be a better policy option to subsidize people to produce food than to provide comparable expenditures for welfare or public employment. Other small farm operators with limited opportunities may benefit from training and increased access to nonfarm jobs through rural industrialization or outmigration. For people who cannot work, direct income payments and welfare reform would be needed.

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[1] This criterion excludes the larger farms that account for most of total farm sales and realize a substantial share of their net income from farming. It is the criterion used to define a small farm in the Food and Agriculture Act of 1977.

The focus in small farm literature and legislation appears to be on increasing the well-being of these families. The Rural Development Act of 1972, the Food and Agriculture Act of 1977, and proposed legislation such as the Young Farmers Homestead Act and the Family Farm Development Act all make such references.

An initial reaction by researchers to this challenge has traditionally been to formulate farm firm microeconomic analyses. Not unexpectedly, the result of this approach most often demonstrates only minute promise of economic improvement from increased agricultural activity for the small farm family. No doubt this may be one reason why small farm advocates have become disenchanted and frustrated with conventional economic efficiency criteria.

Contributions of small farms to the rural community are much greater than a measure of gross farm output would suggest. An aggregate regional approach to small farm research is needed. Recently there has been evidence offered to support the viewpoint that rural communities derive greater benefits from an agricultural sector composed mainly of smaller scale farms than from a structure composed mainly of a few large-scale farms.[2] The small farm structure results in more diversified and stable employment, a larger volume of local business activity, more schools, parks and other public services, and greater participation in social and civic organizations. A larger number of small farms would result in a greater total net income to the farming sector and more persons employed in agriculture, but it would also mean a lower net income per farm and slightly higher consumer expenditures for food.

The more important reasons why society should preserve, protect, and support the small farm sector may center around their beneficial contributions to local communities. ■

Small farm profile: Selected characteristics of farms and farm operators with annual gross sales of less than $20,000

Characteristics	Unit	Farms with less than $20,000 gross sales
1976:		
Farms	Number	1,996,000
Percentage of—		
All farms	Percent	72
Farm assets	do	51
Farm liabilities	do	17
Farm sales	do	10
Federal farm program payments	do	24
Average—		
Farm sales	Dollars	4,825
Net income from farming	do	2,560
Proprietor's equity	do	82,902
Real estate debt	do	6,741
Family income .	do	15,093
Percentage of—		
Family income from off-farm sources	Percent	83
Families in poverty	do	15-20
1974:		
Average age of operators	Years	52
Percentage of operators—		
Under 35 years	Percent	12
65 years and older	do	23
Working off-farm 200 days or more	do	42
Who are minorities	do	4
1970, Percentage of operators with less than high school education	do	67

Sources: U.S. Department of Agriculture, Economic Research Service, *Farm Income Statistics* (July 1977) and *Balance Sheet of Farming Sector* (Sept. 1977). U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Agriculture*, 1974. U.S. Department of Commerce, Bureau of the Census, "Consumer Income," *Current Population Report*, Series P-60, No. 107 (Sept. 1977). This profile has been developed from independent data sources. Each source provides information on the small farm population; however, different sampling techniques and concepts are used. This prevents accurate description of different segments of the population; therefore, data presented are statistical averages derived from each of the different sources.

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[2] Community Services Task Force Report to the State of California, *The Family Farm in California*, Small Farm Viability Project, Sacramento, California, November 1977 and Sonka, Steven T., and Earl O. Heady, *American Farm-Size Structure in Relation to Income and Employment Opportunities of Farms, Rural Communities, and Other Sectors*, Center for Agricultural and Rural Development, CARD Report 48, Iowa State University, Ames, Iowa, June 1974.

PRIORITY ISSUES PROGRAM

*By James Cantwell**

There are many important problems for agricultural economists to address, and it is difficult to know which ones should receive top priority. ESCS conducts a Priority Issues Program to foster a closer relationship between ESCS and the university community and to encourage research in areas considered to be important. Under the program, ESCS funds several small, potentially important research projects located at universities. In 1978, the second year of the program, 11 projects were funded. The purpose of this note is to let AER readers know what kinds of issues were selected in 1978.

Grain Storage

Government grain storage policies have periodically resulted in unstable prices or accumulation of publicly held grain stocks. Problems associated with grain storage programs have led to increased interest in alternative means for acquiring or releasing grain stocks to stabilize prices. The timeliness of the topic is punctuated by 1977 legislation which encourages an international emergency food grain reserve. Refinements in the theory of storage are needed to improve quantitative models of grain demand and to evaluate alternative grain reserve programs and policies. By incorporating factors affecting private storage into total demand relationships, the impact of grain storage policies can be more effectively determined. Two projects were funded on the grain issue.

Food Aid Program

Two contrasting effects of food aid programs in developing countries have been identified: (1) They can be used to increase food production in developing countries, and (2) food aid can decrease food production by exerting downward pressure on prices. For selected developing countries, ascertaining the impact of food aid on prices, consumption levels, and agricultural output will increase understanding of the merits and disadvantages of food aid.

European Community Membership

Greece, Portugal, and Spain have recently applied for membership in the nine-member European Community (EC-9). If membership is achieved, the three countries will adopt the Community's highly subsidized and protective Common Agricultural Policy. It is unclear what impact these prospective changes will have on the demand, supply, and trade of agricultural commodities of significance to the United States. Increased trade within an EC-12 could displace U.S. exports to the area, and a larger volume and variety of subsidized exports from an EC-12 could mean increased competition for the United States in non-EC markets. On the other hand, a potential for faster economic growth in Greece, Portugal, and Spain through EC membership offers some benefits to the United States.

Changes Affecting Cooperatives

Eligibility for borrowing from the U.S. Bank for Cooperatives System was eased under 1976 legislation. Among the potential new borrowers are several large, regional electricity generating and transmitting cooperatives. These new borrowers have debt-to-equity ratios higher than those of traditional borrowers. This affects membership equity policies of the Bank for Cooperatives System which require that equity within the system be held by current patrons, and that equity ownership be distributed among borrowers in proportion to the level of usage. New equity capital policies are needed to cope with adverse effects of the change and to assess impacts on the effective interest rates.

Communication within Cooperatives

Growth in the size of farmer cooperatives has made communication between management and the membership more difficult. To the extent that member interest, patronage, and morale are diminished as a result of such loss of communication, program effectiveness may be reduced substantially and members would be less involved in the decisionmaking process.

Food Consumption Patterns

Changes in the socioeconomic and demographic characteristics of the U.S. population alter the demand for farm products. Trends in food consumption patterns can be explained in part by changes in lifestyle; for example, more wives work outside the home, households are smaller, and more persons eat out. When that linkage is better understood, we can improve our predictions of changes in food consumption patterns.

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*The author is an economist in the Economic Development Division, ESCS. Clark Edwards and the ESCS Priority Issues Planning Committee worked with the author to prepare this note. The 1978 Committee consisted of Gary Taylor (Chairman), Jack Armstrong, John Baritelle, John Berry, Anthony Burris, Bernal Green, and Roger Strohbehn.

Price Support Programs

Farmer participation in price support programs, which affect farm size and growth, can be explained in part by socioeconomic and demographic characteristics of farm operators. A better understanding of these linkages will improve our assessment of the impacts of farm programs and the distribution of benefits.

Grazing Fees

A major controversy surrounds the issue of grazing fees for the use of public lands. To the extent that public grazing fees are less than private leases, the difference may be capitalized into private land value. A better understanding of the economic and institutional forces that affect the relationship between public grazing fees and changes in private land values will aid policy decisions in this area.

Land Use Decisions

The markets which allocate land among competing uses are imperfect. They are affected by intertemporal externalities, public good characteristics of land, and influences from related markets for insurance and capital. Several States have adopted land use programs to influence private landowner decisions toward public land use goals. A better understanding of the land use decisionmaking process of owners and the forces affecting use decisions will provide a basis for establishing public programs to guide private land use for public purposes.

Technological Change

Declining groundwater supplies and rising energy prices imply that the survival of irrigated farms in certain areas, such as the Texas High Plains and Arizona, is assured only for the most efficient water users. An understanding of the impacts of adopting new farm technologies and irrigation practices on individual farms, as well as on aggregate farm output, is needed to develop public policies for the conservation of both water and energy. ■

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Articles: Seckler and Young, "Economic and Policy Implications of the 160-Acre Limitation in Federal Reclamation Law"; Hall and LeVeen, "Farm Size and Economic Efficiency: The Case of California"; Pope, "The Expected Utility Hypothesis and Demand-Supply Restrictions." Notes: Beierlein and Schrader, "Patron Valuation of a Farmer Cooperative under Alternative Finance Policies"; Matulich, "Efficencies in Large-Scale Dairying: Incentives for Future Structural Change"; Martin and Johnson, "Tobacco Technology and Agricultural Labor"; Svedberg, "World Food Sufficiency and Meat Consumption"; Thraen, Hammond, and Buxton, "Estimating Components of Demand Elasticities from Cross-Sectional Data"; and Geithman and Marion, "A Critique of the Use of BLS Data for Market Structure-Price Analysis." Plus more Articles, Notes, Book Reviews, News.

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TEN RULES FOR DOING ECONOMIC STUDIES IN A POLITICAL ENVIRONMENT

*By Don Paarlberg**

1. *Have your economics straight.*

Nobody expects you to be a political expert. But people do expect you to know your economics. If you are deficient in both, you are in bad shape. Remember: Your job is to be a professional economist, not an amateur politician.

2. *Don't leak.*

Report only to your boss. Let him take the bows—and the brickbats. If you leak, you will soon find that you will not be trusted with the information you need to do your job. Tell the reporters what you legitimately can. In dealing with the press, you have an opportunity to determine the nature of the relationship. If you treat the reporters with respect, in most cases they will reciprocate. Tell the truth, especially if you have a poor memory. Cleverness may get you some short-term gains but it will kill you in the end.

3. *Don't be overly concerned with survival.*

Survival is a means, not an end. The end is service to the public. If you survive but accomplish little, you are simply occupying space that should be given over to a better, bolder man.

4. *Be sure your boss wants an honest job.*

If he doesn't, and you are a principled man, you should get out, or you will be quite unhappy.

5. *Keep probing.*

Some subjects are not researchable because they are politically sensitive or because adequate research methods are not available. But these limits are not as restrictive as most people think, and they keep changing. Keep probing and challenging to find the new limits. When you find them, respect them. In choice of method, use as a criterion the usefulness of the results rather than the prestige of the technique. Try to anticipate issues and research them before they become emotional. It is difficult to do good research in the white heat of controversy. It is better to break new trails than to sift the ashes of campfires laid by others. Don't boast of your successes unless you are also willing to be castigated for your failures. Don't be too avid a spectator of your own performance. Don't keep pulling yourself up by the roots to see how you're doing. Try to be objective. Objectivity does not mean steering midway between rival views, it means steering toward your objective, which should be the truth. Don't profess to be without value judgments. There is no such man, and if there were, he would be unfit to do responsible research. Know your values, and let them be known to others. Respect the right of other people to *their* value judgments. Recall that what may seem a conflict of testimony may in fact be evidence of the many-sidedness of truth.

6. *Don't be rigid.*

It is better to be resilient than to be either rigid or relaxed. Research should be done in a spirit of inquiry, and the essence of inquiry is that it is not too sure of the answers.

7. *Don't malign the bureaucracy.*

What today may seem like obstinacy may tomorrow help you bridge over what would otherwise be a catastrophic error. If at all possible, trust your subordinates, knowing that trust tends to engender trustworthiness. At the same time, don't allow yourself to be captured by your subordinates—or by your boss. You don't owe total loyalty to either. Don't be surprised if your relationships, both up and down, turn out to involve a tantalizing combination of exasperation and affection. This is the norm, not the aberration.

8. *Don't impugn a man's motives.*

How can you know another man's motives? You are not in his skin. You can't even be sure of your own motives. I quote President Eisenhower's counsel: "If you have a difference with a man, allow him a way to retreat with honor. Remember, a man's honor is his proudest possession and if you frame an issue so that his honor is at stake you leave him no choice but to fight you with every weapon at his command. There is no good reason to make your battles that tough."

9. *Communicate well.*

Respect deadlines. A perfect report arriving too late is useless. Remember that the purpose of your report is to help your reader, not to impress your colleagues or to save your own skin. Be brief. The relationship between length of the report and reader interest is best described by a curve that is negative and steep, approaching the base line as an asymptote. Use plain language. The best counsel on communication was given by the Apostle Paul nearly 2000 years ago: "Unless you utter by the tongue speech that is clear, how will it be known what is spoken?"

10. *In special cases disregard the above.*

Doing economic research in a political environment is too complex an undertaking to be consistently governed by this or any other set of rules. Honor these rules as you would the rules that govern parking—sometimes in the breach but most often in the performance. ■

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*Dr. Paarlberg, former USDA Director of Agricultural Economics, is Professor Emeritus at Purdue University.

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